



# **RICHMOND HIGHWAY CORRIDOR IMPROVEMENTS**

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**Richmond Highway (Route 1) Corridor Improvements  
Project Between Jeff Todd Way and Napper Road  
Fairfax County, Virginia**

## **REVISED ENVIRONMENTAL ASSESSMENT July 2020**



VDOT Project #: 0001-029-205, C501, P101, R201  
UPC#: 107187

## REVISED ENVIRONMENTAL ASSESSMENT

### **RICHMOND HIGHWAY (ROUTE 1) CORRIDOR IMPROVEMENTS PROJECT BETWEEN JEFF TODD WAY AND NAPPER ROAD, FAIRFAX COUNTY, VIRGINIA**



VDOT Project #: 0001-029-205, C501, P101, R201

UPC#: 107187

**July 2020**

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
and  
VIRGINIA DEPARTMENT OF TRANSPORTATION

## **REVISED ENVIRONMENTAL ASSESSMENT**

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### **RICHMOND HIGHWAY (ROUTE 1) CORRIDOR IMPROVEMENTS**

VDOT Project #:0001-029-205, C501, P101, R201, UPC #: 107187

Federal Project No.:STP-5A01(686)

From: Jeff Todd Way

To: Napper Road

Submitted Pursuant to 42 U.S.C. 4332(2)(C)

Approved for Public Availability:

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**Date**

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**Division Administrator  
For Federal Highway Administration**

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## LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
AAWDT	Average Weekday Daily Traffic
ACS	American Community Survey
AOI	Area of Interest
APE	Area of Potential Effect
ASTM	American Society of Testing and Materials
BRT	Bus Rapid Transit
CBC	Community Business Centers
CBPA	Chesapeake Bay Preservation Act
CEDAR	Comprehensive Environmental Data and Reporting System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLRP	Constrained Long-Range Plan
CNEs	Common Noise Environments
CO	Carbon Monoxide
CWA	Clean Water Act
CZMP	Coastal Zone Management Program
dBA	A-weighted Sound Decibel
DRPT	Department of Rail and Public Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
ENTRADA	Environmental Traffic Data Analysis Program (VDOT)
ESA	Environmental Site Assessment
EQC	Environmental Quality Corridor
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
GIS	Geographic Information System
GWMA	Groundwater Management Areas
HHS	Department of Health and Human Services
HMA	Hazardous Materials Assessment
HSEMA	Homeland Security and Emergency Management Agency
HUC	Hydrologic Unit Codes
ICE	Indirect Cumulative Effects
IPaC	Information for Planning and Conservation (USFWS)
LOD	Limits of Disturbance



LOS	Level of Service
LPA	Locally Preferred Alternative
MPH	Miles Per Hour
MSAT	Mobile Source Air Toxics
MWCOG	Metropolitan Washington Council of Governments
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NCHRP	National Cooperative Highway Research Program
NCRTPB	National Capital Region Transportation Planning Board
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NCDOT	North Carolina Department of Transportation
NVTA	Northern Virginia Transit Authority
OCR	Office of Community Revitalization
OIPI	Office of Intermodal Planning and Investment
OMVHS	Original Mount Vernon High School
PA	Programmatic Agreement
PCB	Polychlorinated Biphenyl
PEM	Palustrine, Emergent
PFO	Palustrine, Forested
PIM	Public Information Meetings
POW	Palustrine, Open Water
REX	Richmond Highway Express
RMA	Resource Management Area
RPA	Resource Protection Area
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SSA	Sole Source Aquifer
TAZ	Traffic Analysis Zone
TIP	Transportation Improvement Program
TNM	Traffic Noise Model (FHWA)
TTI	Travel Time Indices
USACE	US Army Corps of Engineers
USDOT	US Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

USGS	US Geological Survey
v/c	Volume to Capacity Ratio
VAC	Virginia Administrative Code
VaFWIS	Virginia Fish and Wildlife Information Service
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDCR- DNH	Virginia Department of Conservation and Recreation – Division of Natural Heritage
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VIMS	Virginia Institute of Marine Science
VMT	Vehicle Miles Traveled
VRE	Virginia Railway Express
VRRM	Virginia Runoff Reduction Method
WMATA	Washington Metropolitan Area Transit Authority
WOUS	Waters of the United States

## 1. PURPOSE AND NEED

### 1.1 INTRODUCTION

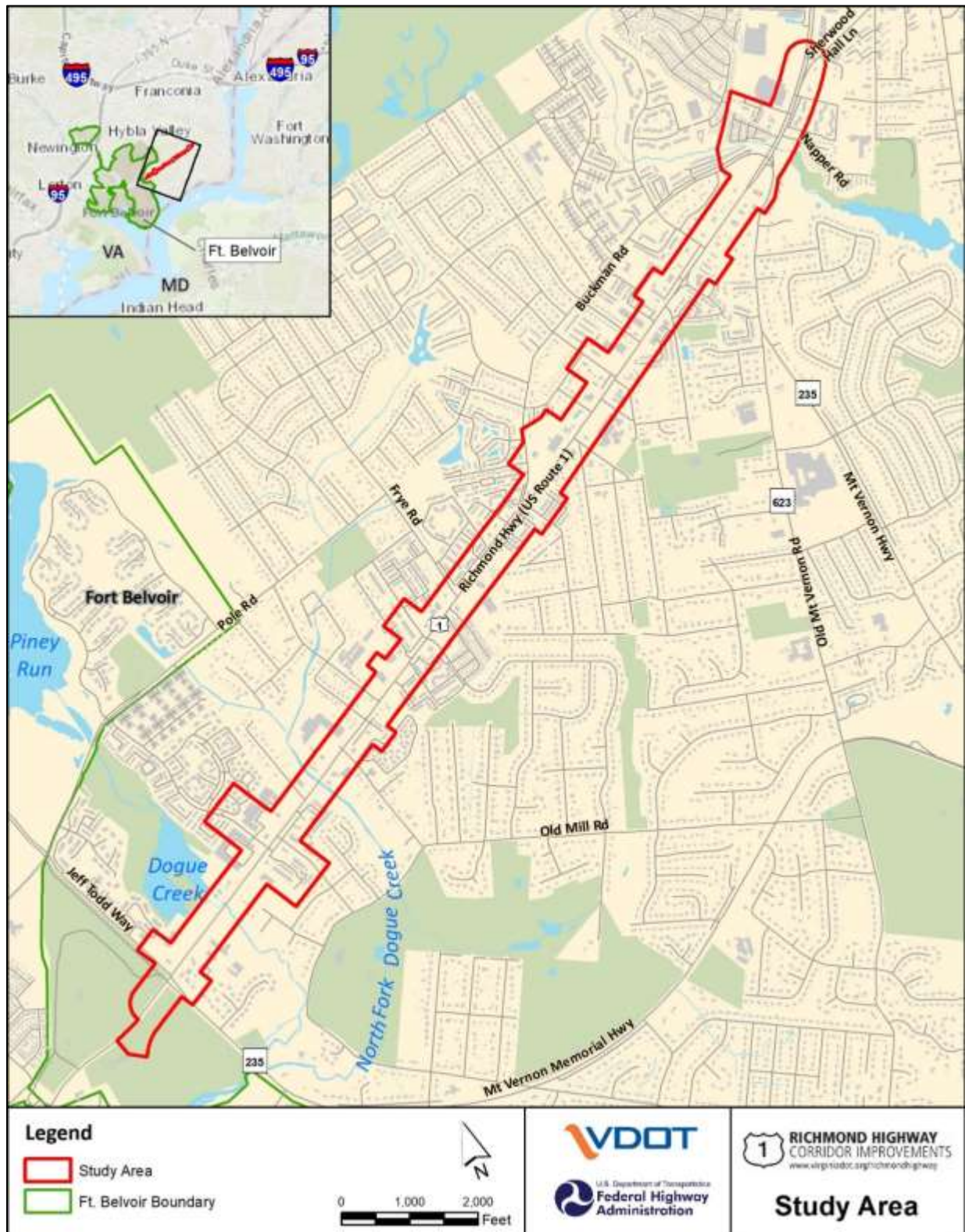
The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA), prepared an Environmental Assessment (EA) for the Richmond Highway (Route 1) Corridor Improvements Project between Jeff Todd Way and Napper Road (**Figure 1-1**). Improvements are proposed for an approximate 2.9-mile section of Richmond Highway between Route 235 (Mount Vernon Memorial Highway – South) to 0.07 miles north of Route 235 (Mount Vernon Highway – North) at Napper Road. The environmental study area extends further south to tie into the recently completed Richmond Highway Widening project through Fort Belvoir, and north along the Richmond Highway to Sherwood Lane. The EA was being prepared in accordance with the National Environmental Policy Act (NEPA), FHWA regulations at 23 Code of Federal Regulations (CFR) § 771 and Technical Advisory T 6640.8, and Council on Environmental Quality (CEQ) guidance at 40 CFR § 1500 -1508.

In October 2018, the EA was approved for public availability, followed by a 30-day comment period, during which input and feedback from interested stakeholders were provided via written letters, email, online comment forum, or verbal testimony. The stakeholders included individuals, special interest groups, government and regulatory agencies, non-profit organizations, community organizations, and commercial entities. Based on the public comments received, the EA has been revised to improve or modify the analysis, where necessary, as well as make factual or technical corrections. Responses to comments received on the EA have been included as **Appendix A**. Pursuant to 23 CFR §771.119(g), this Revised EA has been prepared to document these changes and to support FHWA in their decision-making on the proposed Build Alternative action. The following sections describe the basis for preparing an EA, the Study Area for the Richmond Highway (Route 1) Corridor Improvements Project (hereafter Richmond Highway), the history of the improvement studies leading to the development of this Revised EA, and existing and future transportation needs in the Study Area. The chapter concludes with a summary of the transportation needs discussed earlier in the chapter.

### 1.2 BASIS FOR PREPARING AN EA

A decision to prepare an EA rather than an Environmental Impact Statement (EIS) is to determine whether significant environmental impacts would occur. Pursuant to NEPA, the determination of impact significance requires considerations of both context and intensity (40 CFR § 1508.27). Context refers to the setting of the project (local, state, region, national). Intensity refers to the severity of the impact. The setting for this project is approximately 2.9 miles of an existing heavily traveled principal arterial in an urbanized area. The highway has been in place for decades. Lands along the Study Area are largely developed as commercial, residential and office properties. Lands that are not developed are largely publicly owned parks. The proposed improvements would widen Richmond Highway from a four-lane undivided roadway to a divided six-lane facility with bicycle and pedestrian accommodations, and a median wide enough to accommodate future Bus Rapid Transit (BRT) as referenced in the Department of Rail and Public Transportation (DRPT) Multimodal Study (DRPT, 2015) / Fairfax County Board of Supervisors Resolution (Fairfax County, 2015a). The median would be maintained as a grass strip until the implementation of the BRT.

**Figure 1-1: Richmond Highway Study Area**



Chapter 3 Environmental Consequences describes the environmental impacts of the project. Based on the analyses of the intensity of those impacts, the impacts would not be significant. The following information supports this conclusion:

- The Build Alternative would not cause any violation of federal, state or local law or requirements imposed for the protection of the environment.
- The Build Alternative would have no adverse effect on historic properties along Richmond Highway in the Study Area, a finding in which the State Historic Preservation Officer (SHPO) has concurred.
- With one exception, the Build Alternative would not use any Section 4(f) properties along the study highway. The one exception would be the Original Mount Vernon High School (OMVHS), owned by Fairfax County. However, the alternative would have a *de minimis* impact on that property.
- Although the Build Alternative would result in approximately 17 residential housing unit and 46 commercial displacements, the number is not significantly high given the urban setting of the project. Furthermore, all displacees can be relocated in accordance with federal relocation requirements.
- No disproportionately high and adverse environmental effects on minority or low-income populations would occur under the Build Alternative.
- All applicable air quality requirements of NEPA and federal and state transportation conformity regulations would be met. As such, the Build Alternative would not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the National Ambient Air Quality Standards established by the US Environmental Protection Agency (USEPA).
- Although noise impacts would occur along the Richmond Highway in the Study Area, these impacts can be mitigated by installing new barriers where they are determined to be feasible and reasonable. Because this is already an existing heavily traveled highway, future build condition noise levels would not be substantially higher than no-build condition noise levels.

**Chapter 4** summarizes the agency and public involvement conducted for the Richmond Highway Corridor Improvements Revised EA to date. Federal, state and local agencies, adjacent property owners and the public provided input during scoping, at the public information meetings, and the Public Hearing. No comments were received that objected to the preparation of an EA rather than an EIS.

If, at any point during the EA process, significant environmental impacts are identified, then an EIS would be prepared.

### 1.3 STUDY AREA

Based on historical connections to the state capital in Richmond, Route 1 is also known as the “Richmond Highway.” Richmond Highway is the principal north-south route for local traffic in eastern Fairfax County for shopping and other general-purpose trips and serves as a major commuter route and an alternate north-south route for nearby Interstate 95 (I-95). The section of Richmond Highway evaluated in this EA is in the southeast portion of Fairfax County between Hybla Valley to the north and Fort Belvoir to the south (**Figure 1-1**).

Richmond Highway is currently functionally classified as an “Other Principal Arterial” according to FHWA’s criteria (FHWA, 2013). Other Principal Arterials in urban settings serve major centers of metropolitan



areas and directly serve adjacent land uses. The existing types of access for the Richmond Highway include driveways to specific parcels and at-grade intersections with other secondary roads.

Richmond Highway in the Study Area is a four-lane, undivided road with left turn lanes at all signalized intersections; and right and left turn lanes in each direction at major destinations to either side of the highway; however, intermittent sections include left turn lanes and painted or raised concrete median. Currently there are left-turn lanes at most of the unsignalized intersections. The posted speed limit is 45 miles per hour (mph).

Richmond Highway on either side of the Study Area has six general-purpose lanes (**Figure 1-2**). Beginning at the southwest end of the current Study Area at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection, Richmond Highway was recently widened to six lanes extending 3.68 miles south through Fort Belvoir and ending at Telegraph Road. Richmond Highway has also been previously widened to six general-purpose lanes from approximately the Ladson Lane intersection in the northern Study Area, north to I-95 / I-495.

## 1.4 HISTORY OF STUDY

Many studies and plans have been completed over the last 18 years to assess transportation issues in the Richmond Highway corridor. Each study shown in **Figure 1-3** has identified transportation challenges in the corridor as well as provided recommendations to address these challenges as described in **Table 1-1**. The previous studies have consistently identified three key issues:

- viable multimodal travel options on the corridor are limited and / or insufficient
- congestion impedes reliable and efficient travel
- existing transportation services and networks fail to support planned land uses and economic development efforts

The most recent study completed in 2015 is the *Route 1 Multimodal Alternatives Analysis* (hereafter “DRPT Multimodal Study”) sponsored by the DRPT, VDOT, the Office of Intermodal Planning and Investment (OIPI) and Fairfax and Prince William Counties (DRPT, 2015). The DRPT Multimodal Study identified a range of multimodal improvements that best met community needs and the needs of travelers to, and through, the 15-mile Richmond Highway corridor extending from Route 123 in Woodbridge in Prince William County to I-95 / I-495 in Fairfax County. A *Purpose and Need Report* (DRPT, 2014a) completed by the DRPT Multimodal Study established elements of the Purpose and Need for the proposed improvements to the section of Richmond Highway evaluated in this EA.

The needs in the corridor generated by the DRPT Multimodal Study for their 15-mile study location along Richmond Highway were developed as follows:

- reviewed and analyzed past plans and studies and current County policy guidance
- assessed existing and forecasted / desired conditions for transportation and land use
- engaged communities and solicited public and stakeholder input

After extensive public and agency engagement (see **Chapter 4 Coordination and Comments**), four specific needs for a major multimodal investment in the corridor were identified by the DRPT Multimodal Study:

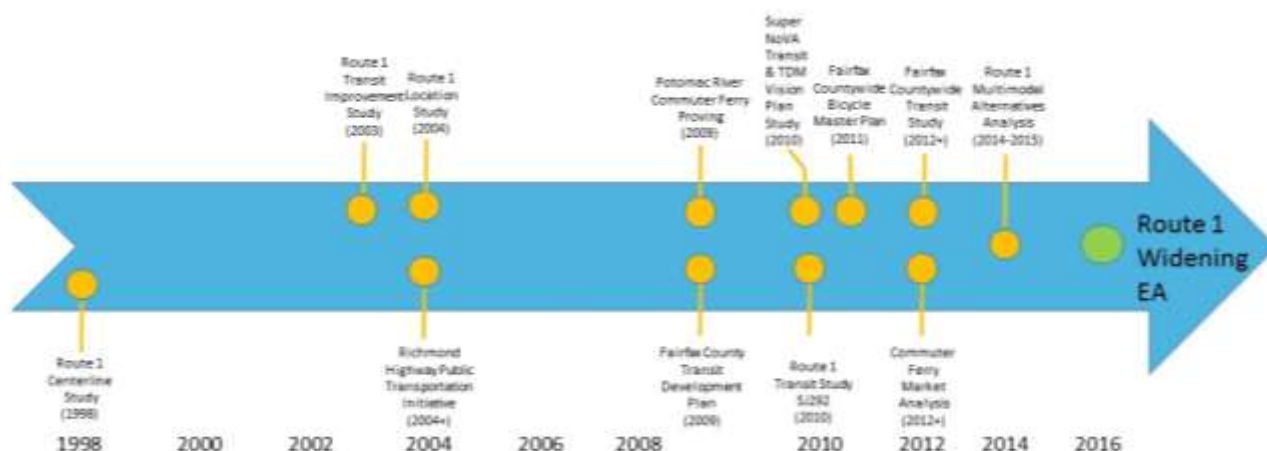
- attractive and competitive transit service to support transit dependent population
- safe and accessible pedestrian and bicycle access
- provide appropriate level of vehicle accommodation
- support and accommodate anticipated population and employment growth

**Figure 1-2: Richmond Highway Six-Lane Segments Adjacent to Study Area**





**Figure 1-3: Previous Richmond Highway Studies**



**Table 1-1: Needs and Recommendations of Previous Studies (Chronologically)**

Plan	Agency	Date	Identified Needs	Alternatives Recommended for Richmond Highway
<b>Route 1 Centerline Study</b>	VDOT	1998	<ul style="list-style-type: none"> <li>Increasing congestion threatens mobility and economic development</li> <li>Non-motorized facilities are inadequate</li> <li>Enhanced transit is necessary to meet travel demands</li> </ul>	<ul style="list-style-type: none"> <li>Additional lane in each direction throughout</li> <li>Bicycles in shared outer lane (15')</li> <li>Pedestrians (10' planting strip, 6' sidewalk)</li> <li>Accommodation for higher quality transit (undefined)</li> </ul>
<b>Route 1 Transit Improvement Study</b>	WMATA <sup>1</sup>	2003	<ul style="list-style-type: none"> <li>Substantial growth in development requires enhanced transit services</li> </ul>	<ul style="list-style-type: none"> <li>Phased: BRT "light" (in shared lanes) preceding BRT in dedicated curbside lanes</li> <li>Light rail in dedicated or semi-exclusive lanes</li> </ul>
<b>Richmond Highway Public Transportation Initiative</b>	Fairfax County DOT <sup>2</sup>	2004-present	<ul style="list-style-type: none"> <li>Seriously deficient pedestrian facilities</li> <li>Bus stop amenities are lacking</li> </ul>	<ul style="list-style-type: none"> <li>Safety improvements at intersections</li> <li>Complete sidewalk network</li> <li>Local and express bus stop improvements</li> </ul>
<b>Mt Vernon Vision</b>	Citizens	2010	<ul style="list-style-type: none"> <li>Transportation should support land use development</li> <li>Substantial growth in development requires enhanced transit services</li> </ul>	<ul style="list-style-type: none"> <li>Metrorail: LRT<sup>3</sup> or monorail as an alternative</li> <li>Complete sidewalk network</li> </ul>

Plan	Agency	Date	Identified Needs	Alternatives Recommended for Richmond Highway
<b>Route 1 Transit Study SJ292</b>	DRPT	2010	<ul style="list-style-type: none"> <li>Enhanced transit is necessary to meet travel demands</li> </ul>	<ul style="list-style-type: none"> <li>BRT</li> <li>Complete pedestrian network</li> <li>Additional lane in each direction throughout</li> </ul>
<b>SuperNoVa Transit / TDM Vision Plan</b>	DRPT	2012	<ul style="list-style-type: none"> <li>Additional transportation options are necessary to accommodate growth</li> <li>Enhanced intermodal connections and facilities</li> </ul>	<ul style="list-style-type: none"> <li>BRT or LRT north of Fort Belvoir</li> <li>Pedestrian and bicycle accommodation</li> </ul>
<b>Constrained Long Range Plan and Regional Vision</b>	MWCOG <sup>4</sup>	2013	<ul style="list-style-type: none"> <li>Additional transportation options are necessary to accommodate growth               <ul style="list-style-type: none"> <li>Foster walkable communities</li> <li>Enhanced intermodal connections and facilities</li> <li>Affordable transportation options</li> <li>Secure and reliable funding for transit</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Additional lane per direction</li> </ul>
<b>Route 1 Multimodal Alternatives Analysis</b>	DRPT, VDOT, OIPI <sup>5</sup> , Fairfax County, Prince William County	2014-2015	<ul style="list-style-type: none"> <li>Transit travel time is not competitive with automobiles, service is infrequent, and dwell times at stops and peak period congestion delay transit</li> <li>Pedestrian and bicycle facilities for travel are limited, substandard and unable to compete with the attractiveness of single-occupancy vehicle travel</li> <li>Pedestrian crossings of US Route 1 are infrequent, wide and not near existing transit stops</li> <li>Bicycle access is difficult with few alternative paths</li> <li>Vehicle users experience substantial congestion along US Route 1 during peak periods resulting in</li> </ul>	<ul style="list-style-type: none"> <li>Attractive and competitive transit service to support transit dependent population</li> <li>Safe and accessible pedestrian and bicycle access</li> <li>Provide appropriate level of vehicle accommodation</li> <li>Support and accommodate more robust land development to support anticipated population and employment growth</li> </ul>

Plan	Agency	Date	Identified Needs	Alternatives Recommended for Richmond Highway
			<p>highly variable and unpredictable travel times</p> <ul style="list-style-type: none"> <li>• Current development patterns fail to optimize development potential at designated activity centers and existing street connectivity is poor at commercial nodes</li> </ul>	
<b>Fairfax County Comprehensive Plan – Mt Vernon Planning District</b>	Fairfax County	Amen- ded 2015	<ul style="list-style-type: none"> <li>• Increasing congestion threatens mobility and economic development</li> <li>• Substantial growth in development requires enhanced transit services</li> <li>• Transportation should support land use development</li> </ul>	<ul style="list-style-type: none"> <li>• Consistent 3 lanes per direction throughout</li> <li>• High quality transit (rail or BRT) in dedicated guideway (median) <ul style="list-style-type: none"> <li>• Multiuse trail for bikes and pedestrians (9' buffer, 9' trail)</li> </ul> </li> <li>• Realign: South Buckman opposite Radford Ave, Russell Rd to Reddick Ave, Sacramento Dr to Cooper Rd, Old Mill Rd (Jeff Todd Way) to Mt Vernon Hwy</li> <li>• Consolidate / eliminate sporadic service drives</li> </ul>
<b>Constrained Long Range Plan and Regional Vision</b>	MWCOG	2015	<ul style="list-style-type: none"> <li>• Improve safety and operation of intersections and / or roadway segments</li> <li>• Address congestion</li> <li>• Improve transit</li> </ul>	<ul style="list-style-type: none"> <li>• Widen to 6 lanes</li> <li>• Reconstruct / replace bridges as necessitated to the 6-lane width <ul style="list-style-type: none"> <li>• Bicycle / pedestrian accommodations included</li> </ul> </li> <li>• 2015 Amendment: BRT from Huntington Metro Station to Woodbridge VRE<sup>6</sup> Station</li> <li>• 2015 Amendment: Priority but unfunded US Bike Route 1 Signing in Northern Virginia (VDOT) to install route and wayfinding signage along 50 miles of US Bicycle Route 1, a national AASHTO<sup>7</sup> bicycle route.</li> </ul>
<b>FY 2017 Candidate Projects</b>	NVTA <sup>8</sup>	2015	<ul style="list-style-type: none"> <li>• Severe peak hour congestion</li> <li>• Lack of signals and turn lanes at key intersections <ul style="list-style-type: none"> <li>• Lack of bicycle / pedestrian facilities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Consistent 6-lane facility from Mt Vernon Memorial Hwy to Napper Rd</li> <li>• Signalization and turn lanes where needed</li> <li>• Connect bicycle / pedestrian facilities through corridor</li> </ul>

Plan	Agency	Date	Identified Needs	Alternatives Recommended for Richmond Highway
			<ul style="list-style-type: none"> <li>• Bicycle/pedestrian conflicts with too many driveways</li> <li>• Improve traffic into and out of Fort Belvoir</li> <li>• Supports economic development</li> </ul>	<ul style="list-style-type: none"> <li>• Provision for future transit</li> <li>• Consolidate driveway entrances</li> </ul>
<b>Fairfax County Countywide Transit Network Study</b>	Fairfax DOT	Ongoing	<ul style="list-style-type: none"> <li>• Need more transportation choices for Fairfax County and regional connectivity</li> <li>• Support local and regional economic development goals</li> <li>• Strengthen quality of life by making transit-friendly, sustainable investments</li> </ul>	<ul style="list-style-type: none"> <li>• BRT from Huntington to Woodbridge</li> <li>• Metrorail Yellow Line Extension from Huntington to Hybla Valley</li> <li>• An additional BRT station at Belvoir Rd to serve Pence Gate</li> </ul>

<sup>1</sup>Washington Metropolitan Area Transit Authority

<sup>2</sup>Fairfax County Department of Transportation

<sup>3</sup>Light Rail

<sup>4</sup>Metropolitan Washington Council of Governments

<sup>5</sup>Office of Intermodal Planning and Investment

<sup>6</sup>Virginia Railway Express

<sup>7</sup>American Association of State Highway and Transportation Officials

<sup>8</sup>Northern Virginia Transportation Authority

The DRPT Multimodal Study recommended transit, pedestrian and bicycle, vehicular, and land use and development improvements to Richmond Highway within the EA Study Area. See **Chapter 2 Alternatives** for a detailed description of the alternatives screening criteria, alternatives evaluated, and recommendations made by the DRPT Multimodal Study. The DRPT Multimodal Study recommended Alternative 4 BRT / Metrorail Hybrid as the transit mode for advancement, which includes long-term extension of the Metrorail Yellow Line, from Huntington to Hybla Valley, with BRT in the median within the DRPT Multimodal Study 15-mile corridor. This alternative also included phased implementation of the multimodal improvements within the current EA Study Area consisting of widening Richmond Highway from four to six lanes and providing continuous bicycle and pedestrian facilities. An underground extension of the Metrorail Yellow Line to Hybla Valley was also recommended when warranted by increased population density within the 15-mile study corridor. The DRPT formally endorsed the DRPT Multimodal Study recommendations by resolution in 2014 (DRPT, 2014b), contingent on supportive land use and an achievable funding plan, both of which are advancing.

The Fairfax County Board of Supervisors authorized the amendment of their Comprehensive Plan by resolution in May 2015 to include the DRPT recommendations for “Alternative 4 Bus Rapid Transit (BRT/Metrorail Hybrid)”. In response Fairfax County Department of Planning and Zoning and the Office of Community Revitalization (OCR) is proceeding with actions necessary to revise land use throughout the

corridor referenced as “Embark Richmond Highway”. Concurrent to this initiative staff was directed to implement the widening of Richmond Highway and BRT, which extends from the Huntington Metro Station approximately 3.5 miles north of the Study Area, through the current Study Area, to Accotink Village approximately 1.5 miles south of the Study Area. Consistent with the DRPT Multimodal Study recommendations for phasing roadway improvements to Richmond Highway, Fairfax County first pursued roadway and pedestrian / bicycle improvements to the section of Richmond Highway extending from the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection through Fort Belvoir, and south to the Telegraph Road intersection. The County then pursued widening Richmond Highway and pedestrian / bicycle improvements in the current Study Area from the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection to the Mount Vernon Highway (VA 235) / Buckman Road intersection. The recommended roadway improvements within the current Study Area were subsequently included in the Metropolitan Washington Council of Governments’ (MWCOG) 2015 Financially Constrained Long-Range Transportation Plan (CLRP) and advanced to preliminary design.

In February 2016, FHWA and VDOT initiated this Richmond Highway Corridor Improvements Project EA to evaluate the potential environmental effects of improvements to Richmond Highway between Jeff Todd Way and Napper Road, constructing enhanced bicycle and pedestrian facilities, and accommodating future transit in the median consistent with the DRPT Multimodal Study’s Alternative 4 BRT / Metrorail Hybrid.

In May 2016, the 2015 CLRP was amended to include BRT along Richmond Highway from the Huntington Metro Station approximately 3.5 miles north of the Study Area, through the Study Area, continuing approximately 8 miles south to the Woodbridge Virginia Railway Express (VRE) Station. This independent transit study is currently underway. The current cost to construct the BRT was estimated at approximately \$500 million dollars of which the County has no funding from the Federal Transit Administration (FTA) for construction. On December 2 of 2016, Fairfax County received a grant from DPRT and FTA for funding to expand an ongoing comprehensive plan amendment process to improve access to transit and enable high quality mixed-use development around future BRT stations along Richmond Highway. The planning work will support the continued expansion of Fort Belvoir by improving transit access to the facility and mitigating traffic congestion. Final outcomes will include station area concept plans, urban design guidelines, and a conceptual street grid layout.

Considering the DRPT Multimodal Study and preliminary engineering identification of the roadway deficiencies of Richmond Highway in the Study Area, the Richmond Highway Corridor Improvements EA will address the following needs:

- Accommodate Travel Demand
- Improve Safety

The sections below describe existing and future transportation needs in the Study Area.

## **1.5 NEEDS OF STUDY**

### **1.5.1 Accommodate Travel Demand**

#### **Travel Demand**

Travel demand along Richmond Highway within, and through, the Study Area is generated by various modes (vehicular, bicycle and pedestrian) and users (commuters, freight trucks, military, recreationists and tourists). Richmond Highway provides a vital regional link for commuters traveling to and from large regional employers and institutions in Fairfax and Arlington Counties, Alexandria and the District of

Columbia. Fort Belvoir just south of the Study Area is a major employer in Fairfax County, with approximately 39,000 civilian and military personnel in approximately 140 tenant and satellite organizations (US Army, 2015a and 2016a). The Inova Mount Vernon Hospital, USA Mobility, Defense Contract Audit Agency and Defense Logistics Agency are other major area employers within or near the Study Area (Fairfax County Economic Development Authority, No Date). Tourist destinations within the 2.5 miles of the Study Area include George Washington's Mount Vernon Estate and Gardens, George Washington's Distillery and Grist Mill, the Frank Lloyd Wright-designed Pope-Leighey House, River Farm and Woodlawn Plantation. Recreational destinations near the Study Area include Huntley Meadows Park just north of the Study Area, and Pohick Bay Regional Park and Mason Neck State Park approximately 5 miles southwest of the Study Area. Tourism and recreation are seasonal and traffic peaks during the summer months.

Commuters also use Richmond Highway to access transit stations such as the Huntington Metrorail Station north of the Study Area, and the Woodbridge VRE to the south. Richmond Highway serves as an alternate north to south route for I-95 and a designated District of Columbia Homeland Security and Emergency Management Agency evacuation route (HSEMA, 2016).

Richmond Highway also functions as a route for local traffic for shopping and other general-purpose trips. The Study Area is dominated by commercial and office space generating business and personal travel. Several shopping centers are within the Study Area including:

- Sacramento Center
- Pear Tree Village
- Cooper Shopping Center
- Marcel Shopping Center
- Woodlawn Center
- Lukens Plaza
- Engleside Plaza
- Sky View Park Plaza
- Uno Plaza
- Potomac Square
- Mount Vernon

Using the MWCOC Version 2.2 Regional Travel Demand Model, the DRPT Multimodal Study found that the largest share of trips in the 15-mile study area along the Richmond Highway were those that began and ended in the corridor, followed in frequency by travel to and from other areas of Fairfax County (DRPT, 2014c). Travel demand within the Richmond Highway Corridor Improvements Study Area has been modeled with the updated MWCOC Regional Travel Demand Model Version 2.3.57a. The latest modeling for the current study shows that travel demand in the Study Area generally follows the same pattern identified in the 2014 DRPT Multimodal Study (see the *Richmond Highway Corridor Improvement Traffic Operations Analysis Report*).

**Table 1-2** shows 2016 traffic volumes along Richmond Highway within the Study Area generated by commuters, recreational and tourist travel, shopping and local general-purpose trips as discussed above.

**Table 1-2: Existing (2016) Study Area Traffic Volumes**

Richmond Highway Traffic Section	Average Annual Daily Traffic (AADT)	Average Weekday Daily Traffic (AAWDT)	Northbound AM(PM) Peak Hour	Southbound AM(PM) Peak Hour
From Route 235 (Mt Vernon Memorial Hwy) to Route 235 (Mt Vernon Hwy)	38,645	39,855	1,725 (1,485)	1,160 (1,570)

Travel options to meet existing travel demand are limited in the Study Area along Richmond Highway. The sidewalks along Richmond Highway are discontinuous and there are no dedicated bicycle facilities. Further, there is no dedicated transitway within the study corridor. The lack of travel options along Richmond Highway through the Study Area discourages travel by other modes, contributing to increased vehicular traffic congestion.

### **Accessibility and Mobility**

Transportation accessibility focuses on getting people and goods to destinations in high demand. Accessibility is enhanced by increasing the speed one can travel to reach a destination and the subsequent reduction in travel time (i.e., mobility). Moreover, for transportation to be accessible, it needs to be reliable so that people and goods arrive as planned.

#### *Increase Capacity*

High travel demand coupled with limited capacity leads to congestion that has an adverse effect on travel time and travel reliability. Potential capacity is reduced when considering factors such as lane drops and merges, as well as lack of shoulders and turn lanes. The Richmond Highway transitions from a consistent six general-purpose lanes both north and south of the Study Area to four general-purpose lanes within the Study Area. Lane drops in the Study Area that occur at the Mount Vernon Highway (VA 235) / Buckman Road intersection on the northeast, and the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection on the southwest, cause traffic backups approaching the Study Area during peak travel periods, contributing to congestion. In addition, routine maintenance results in either shoulder or lane closures that affect capacity.

#### *Relieve Congestion*

When travel demand exceeds capacity, congestion occurs. Congestion can be described as a condition characterized by unstable traffic flow, reduced travel speeds, stop-and-go movements, travel delays, and queuing. Vehicular congestion within the Study Area occurs in one of two forms: recurring and non-recurring. Recurring congestion happens on a regular basis at the same general location that is caused by not enough capacity to accommodate traffic volumes. Non-recurring congestion is irregular and occurs at varying times and locations. For example, non-recurring congestion can be caused by weather events, or accidents. Both types of congestion occur in the Richmond Highway Corridor Improvements Study Area.

Congestion can be evaluated in terms of the Travel Time Index (TTI). The TTI is the ratio of actual travel time to free flow travel time such that a TTI of 1.00 indicates free flow conditions, whereas an index of 1.3 indicates travel takes 30 percent longer than in free flow conditions. Peak traffic morning hours are between 7:15 – 9:15 AM and peak traffic evening hours are from 3:15 – 6:15 PM. In 2016, the *Richmond Corridor Study Traffic Operations Analysis Report* calculations for southbound Richmond Highway through the Study Area during the peak traffic morning hours yielded a TTI of 1.6 and during the peak traffic evening hours found a TTI of 1.3. For the northbound lanes, during the morning traffic peak a TTI of 1.4 indicates travel on Richmond Highway through the Study Area takes 40 percent longer than free flow conditions, and during the evening it takes nearly twice as long as free flow (TTI of 1.7).

Another measure of evaluating intersection operation is the traffic volume to capacity ratio ( $v / c$ ). A  $v / c$  ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are typically not expected to experience significant queues and delays. The current study measured existing (2016) traffic maximum  $v / c$  at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection during peak morning hours that had a  $v / c$  of 0.98 and during peak evening hours a  $v / c$  of 1.08. At the Mount Vernon Highway (VA 235) / Buckman Road intersection, maximum peak morning  $v / c$  is 1.26 and 0.89 at peak



evening hours. The data indicates traffic volume on Richmond Highway in the Study Area exceeds existing roadway capacity during peak travel hours.

Factors contributing to congestion in the Study Area include:

- too many access points along the corridor
- lack of turn lanes for driveways and side streets
- poor signal timing
- congestion from downstream points outside of the study area along northbound Richmond Highway

### 1.5.2 Improve Safety

Safety along Richmond Highway in the Study Area is impacted by too many and inadequately spaced driveways (uncontrolled access), inadequately spaced signalized intersections, lack of turn lanes, inadequate shoulder width, inadequate pedestrian and bicycle facilities, and roadway flooding.

#### **Access Management and Roadway Deficiencies**

Much of Richmond Highway in the Study Area is developed with uncontrolled access. Large numbers and close spacing of driveways increase potential conflicts on the road, presenting challenges to drivers, increasing points of conflicts between drivers and pedestrians, and increasing congestion and crashes. Also, spacing is too close between certain Richmond Highway signalized intersections within the Study Area, shoulders are too narrow and turn lanes are lacking, contributing to congestion and crashes.

A five-year crash analysis for Richmond Highway in the Study Area was conducted for the timeframe between May 1, 2011 and April 30, 2016 (see the *Richmond Highway Corridor Improvements Traffic Operations Analysis* report). The crash study limits incorporated the major intersections along approximately 3 miles of Richmond Highway from the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection to the Napper Road intersection. During the study period, a total of 462 crashes occurred between these intersections along Richmond Highway, with the following results:

- 247 injury related crashes and 1 fatality
- 213 crashes causing property damage
- 22 crashes involving pedestrians (no bicycles)

Crash hotspots (30 or more crashes) were identified at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way, Sacramento Drive / Cooper Road and Mount Vernon Highway / Buckman Road intersections. The higher rate of crashes in these areas is attributed to the signal interrupting continuous traffic flow and / or inadequate clearance at the signal; closely spaced signals and high number of accesses; and poor sight distance, respectively. The May 2011 to April 2016 crash rate in the crash study limits was calculated to be 263.13 crashes per 100 million Vehicle Miles Traveled (VMT), considerably higher than the 2015 statewide average of 142.35 per 100 million VMT.

Dogue Creek, North Fork Dogue Creek and Little Hunting Creek are large stream crossings along Richmond Highway in the Study Area (**Figure 1-1**). Flooding on Richmond Highway in the Study Area during high water events is occurring because of inadequate structures at these crossings, posing a safety issue.

### **Pedestrian Bicycle Facilities**

The DRPT Multimodal Study, Fairfax County plans, and National Capital Region Transportation Planning Board (NC RTPB) regional bicycle and pedestrian plans have identified the need for multimodal facilities along Richmond Highway that meet planned goals for walkable communities focused on connectivity to future transit hubs (DRPT, 2014a; Fairfax County, 2014; NC RTPB, 2015). The DRPT Multimodal Study noted several specific pedestrian and bicycle facility needs along the Richmond Highway (DRPT, 2014a), including the following:

- bicycle and pedestrian facilities are not continuous
- pedestrian crossings are infrequent, wide, and not near existing transit stops
- more bicycle access is needed buffered from the heavy traffic on the corridor; and
- Americans with Disabilities Act accommodations are needed to pedestrian destinations such as bus stops in several locations

Currently, sidewalks are discontinuous on both sides of the road through the Study Area, and there are many intersecting driveways. Even though pedestrian crosswalks on the Richmond Highway are within walking distance from most existing transit stops in the Study Area, cross walks are scarce, and present only at seven intersections.

No separate bicycle lanes or paths currently exist within the Study Area. Bicyclists use existing sidewalks in conflict with other pedestrian users. Alternatively, bicycle riders in the vehicular travel-way contend with heavy traffic and higher safety risks. In the Fairfax County *Bicycle Master Plan*, Fairfax County characterizes Richmond Highway in the Study Area as a route “of caution” where “bicyclists are urged to exercise extra caution due to narrow shoulders or lanes, poor sight distances, high traffic volumes, or other challenging characteristics” (Fairfax County, 2014).

Designated trails are located near the Study Area within Mount Vernon Manor Park and Vernon Heights Park, but the trails have no direct connection to Richmond Highway in the Study Area.

## **1.6 NEEDS: FUTURE CONDITIONS**

### **1.6.1 Overview**

**Section 1.4** describes the existing needs along Richmond Highway in the Study Area. In the absence of improvements to address existing needs to accommodate travel demand and improve safety, these needs would continue in the future, as described below.

### **1.6.2 Accommodate Travel Demand**

#### **Travel Demand**

The MWCOC forecasts the number of households, population, and employment in the National Capital Region by Traffic Analysis Zone (TAZ). **Figure 1-4** shows the TAZs encompassing the Study Area. The population of the TAZ surrounding the Study Area is expected to increase from 41,797 in 2015 to 48,436 in 2045, an approximately 16 percent increase (MWCOC, 2016b). Recently, the Record of Decision for the *Fort Belvoir Final Environmental Impact Statement for Short-term Projects and Real Property Master Plan Update* proposed up to 17,000 additional workers at Fort Belvoir by 2030, an increase of approximately 44 percent (US Army, 2015b, 2016b). The Study Area is also within the Hybla Valley / Gum Springs, South County and Woodlawn commercial revitalization areas identified in the 2013 *Fairfax County Comprehensive Plan*. These factors would contribute to future travel demand in the Study Area.

**Figure 1-4: Traffic Analysis Zones (TAZ) Along the Study Area**





From 2016 to 2045, traffic volumes under the No-Build conditions are forecasted to grow as shown in **Table 1-3**. Average annual weekday daily traffic is expected to increase 37.4 percent both at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection on the southwest end of the Study Area, and the Mount Vernon Highway (VA 235) / Buckman Road intersection at the northeast end. The ability to maintain steady traffic flow in the Study Area will become increasingly difficult based on 2045 modeled No-Build traffic volumes.

The lack of pedestrian, bicycle and options for transit dependent populations along Richmond Highway through the Study Area would continue in the future.

### **Accessibility and Mobility**

Under future No-Build conditions, travel time in the Study Area is expected to increase in the 2045 design year compared to existing conditions (**Table 1-4**). The future No-Build traffic model signal timing is optimized for the estimated demand under the existing lane configuration. Northbound travel on Richmond Highway in the Study Area in the evening peak travel period is forecast to take over 15 times (i.e., 1,500 percent) longer than free-flow conditions. The TTI is expected to worsen, even though, as noted in **Table 1-4**, traffic modeling indicates traffic fails to enter / exit the network within the Study Area at the southern and northern limits due to signal cycle failure outside the Study Area. Signal cycle failure occurs when traffic queues do not completely discharge during each signal cycle, forcing drivers to wait for more than one red light. The Study Area TTI shown in **Table 1-4** account for the signal cycle failures outside the Study Area.

**Table 1-3: Existing (2016) and 2045 No-Build Design Year Traffic Volumes**

Year	Richmond Highway Traffic Section	Average Annual Daily Traffic (AADT)	Average Weekday Daily Traffic Volume (AAWDT)	Northbound Peak Hour AM / (PM)	Southbound Peak Hour AM / (PM)
Existing (2016)	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	38,645	39,855	1,725 (1,485)	1,160 (1,570)
No-Build Design Year (2045)	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	53,085	54,745	2,370 (2,040)	1,595 (2,155)

**Table 1-4: Existing (2016) and 2045 No-Build Travel Time Index (TTI)**

Travel Direction and Peak Hour	Existing (2016) TTI	No-Build Design Year (2045) TTI
Southbound AM Peak <sup>1</sup>	1.6	1.7
Northbound AM Peak <sup>2</sup>	1.4	2.5
Southbound PM Peak <sup>3</sup>	1.3	2.5
Northbound PM Peak <sup>4</sup>	1.7	15.3

<sup>1</sup>16% of traffic fails to enter the network due to signal cycle failure at northern study limits

<sup>2</sup>19% of traffic fails to enter the network due to signal cycle failure at southern study limits

<sup>3</sup>23% of traffic fails to enter the network due to signal cycle failure at northern study limits

<sup>4</sup>32% / 64% of traffic fails to enter / exit the network due to signal failure at southern / northern limits, respectively

Intersection congestion as measured by  $v / c$  is also predicted to increase at the Mount Vernon Highway (VA 235) / Buckman Road intersection by 2045 under the No-Build design year (**Table 1-5**) compared to existing (2016) conditions. However,  $v / c$  would improve under the No-Build design year (2045) compared to existing (2016) conditions. This is because the Richmond Highway widening project extending south from the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection through Fort Belvoir would be completed by 2045, including two northbound left turn-lanes and a continuous exclusive right turn-lane at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection. That project recently completed construction. With the increase in northbound lane capacity at the intersection, traffic operations are expected to improve in the future.

**Table 1-5: Existing (2016) and 2045 No-Build Volume to Capacity Ratio ( $v / c$ ) at Two Richmond Highway Study Intersections**

Location	Existing (2016) AM (PM) $v / c$	No-Build Design Year (2045) AM (PM) $v / c$
Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way	0.98 (1.08)	0.91 (0.96)
Mount Vernon Highway (VA 235)/Buckman Road	1.26 (0.89)	1.44 (1.14)

Future increases in travel demand and traffic volumes would decrease access to regional and local travel destinations in the Mount Vernon area due to increasing congestion, travel time, and travel unreliability. Congestion during peak periods would become progressively worse. Periods of congestion would become longer as would the queues resulting from that congestion, especially where the number of lanes drop on either end of the Study Area. Likewise, average travel speeds would decline further, resulting in longer and less reliable travel times. Although routine maintenance along Richmond Highway in the Study Area would continue, there are no currently programmed comprehensive improvements to alleviate existing roadway deficiencies or roadway flooding in the Study Area. These factors would continue to impair Study Area accessibility and mobility for the foreseeable future.

### 1.6.3 Improve Safety

#### Access Management and Roadway Deficiencies

Inadequate access control would exacerbate congestion along the Study Area in the future, based on the modeled increased traffic volumes expected by 2045 (**Table 1-3**). Too many driveways / entrances, closely spaced signals, unsignalized intersections and inadequate turn lanes result in more turning movements that impede traffic flow. Traffic accidents would also likely increase with higher traffic volumes in portions of the Study Area with too many conflict points, as discussed in **Section 1.6.2**.

Roadway flooding issues in the Study Area would continue in the future. The most pressing roadway flooding issue in the Study Area is along the north side of Richmond Highway at the Dogue Creek crossing where the creek is directly eroding the roadbed. Constrained flow at the North Fork of Dogue Creek crossing and the Little Hunting Creek Bridge on Richmond Highway would continue to cause roadway flooding in high water events.

#### Pedestrian and Bicycle Facilities

The Fairfax County *Bicycle Master Plan* states that new roadway projects should consistently include multimodal facilities and that new and rehabilitated bridge projects should include sidewalk and bicycle facilities (Fairfax County, 2014). The plan further states that where a shared use path adjacent to a roadway is proposed along roads where no on-street facilities exist, then shared use paths should be provided on both sides of the street. Where it is infeasible to provide shared use paths on both sides of the road, the plan indicates a single shared use path should be provided consistently on the same side of the road and not alternate sides in contiguous roadway segments. The Plan recommends bikeway improvements in the Study Area include cycle tracks and shared use path. Cycle tracks are dedicated bicycle facilities that physically separate bicyclists from motor vehicle traffic and pedestrian traffic. The Plan acknowledges that cycle tracks can be configured and designed in a variety of ways and does not make a specific recommendation regarding Richmond Highway in the Study Area.

The Fairfax County plan also identifies “Policy Roads” from the Sacramento Drive to Highland Road intersection and Radford Road to Russell Road intersection along the Richmond Highway within the Study Area (see **Section 3.3 Socioeconomic Resources Figure 3-3**). “Policy Roads” are defined where selection of bicycle facilities should be coordinated with other planning decisions regarding a roadway’s capacity and operation as well as the type and configuration of development alongside it.

The NCRTPB 2015 *Bicycle and Pedestrian Plan for the National Capital Region* indicates bicycle and pedestrian projects are needed along the Richmond Highway through the Study Area (NCRTPB, 2015).

With the forecasted population increase and travel demand, the lack of pedestrian and bicycle facilities along Richmond Highway in the Study Area would contribute to decreased safety as the same conflict points would exist, except with even more vehicular traffic. This could lead to increased vehicle crashes with pedestrians and bicycles.

## 1.7 PURPOSE AND NEED SUMMARY

Based on the existing and future transportation needs as described above, the purpose and need for the project is to:

- Accommodate Travel Demand – better accommodate existing and future travel demand at peak travel hours, reducing congestion and increasing corridor accessibility and mobility (including

BRT implementation based on the DRPT Multimodal Study and Fairfax County Board of Supervisors Resolution)

- Improve Safety – implement access control; provide adequately spaced signalized intersections; provide turn lanes where needed; improve structures at natural stream crossings; and enhance pedestrian and bicycle facilities



## 2. ALTERNATIVES

### 2.1 INTRODUCTION

This chapter describes the alternatives development process and screening criteria approach for the Richmond Highway Corridor Improvements EA, including the identification of an initial range of alternatives considered and alternatives retained for detailed evaluation. Initial alternatives that were previously considered are described in **Section 2.2**. The DRPT Multimodal Study serves as the basis for this alternatives chapter that included the use of three levels of evaluation to identify refined alternatives and to advance a selection. The DRPT Multimodal Study included transit alternatives that are not evaluated in the EA, however, the Richmond Highway (Route 1) Corridor Improvements Project would not preclude provision for future BRT in the median of Richmond Highway.

### 2.2 ALTERNATIVES NOT RETAINED FOR DETAILED STUDY

#### 2.2.1 DRPT Multimodal Study (2015)

The DRPT Multimodal Study conducted between 2013 to 2015 developed multiple alternatives that overlap the current Study Area to meet a purpose and need statement as discussed in Chapter 1. The alternatives development process used by the DRPT Multimodal Study is described in the *Detailed Evaluation of Alternatives Report* (DRPT, 2014c) and *Final Report* (DRPT, 2015)<sup>1</sup>. The study examined the 15-mile corridor extending from Route 123 in Woodbridge in Prince William County to the I-95 / I-495 Beltway in Fairfax County (**Figure 2-1**). The study identified a range of multimodal improvements that best met community needs and the needs of travelers to, and through, the 15-mile Richmond Highway corridor using three levels of screening criteria (**Figure 2-2**). Ultimately, four alternatives were evaluated in detail:

- Alternative 1: Curb Running BRT
- Alternative 2: Median BRT
- Alternative 3: Median Light Rail Transit
- Alternative 4: BRT / Metrorail Hybrid

The DRPT Multimodal Study evaluated potential environmental impacts for the four alternatives in the 15-mile study corridor that factored into the selection of a preferred alternative. The current Richmond Highway widening project is a 2.9-mile subsection of the overall 15-mile project discussed in the DRPT Multimodal Study.

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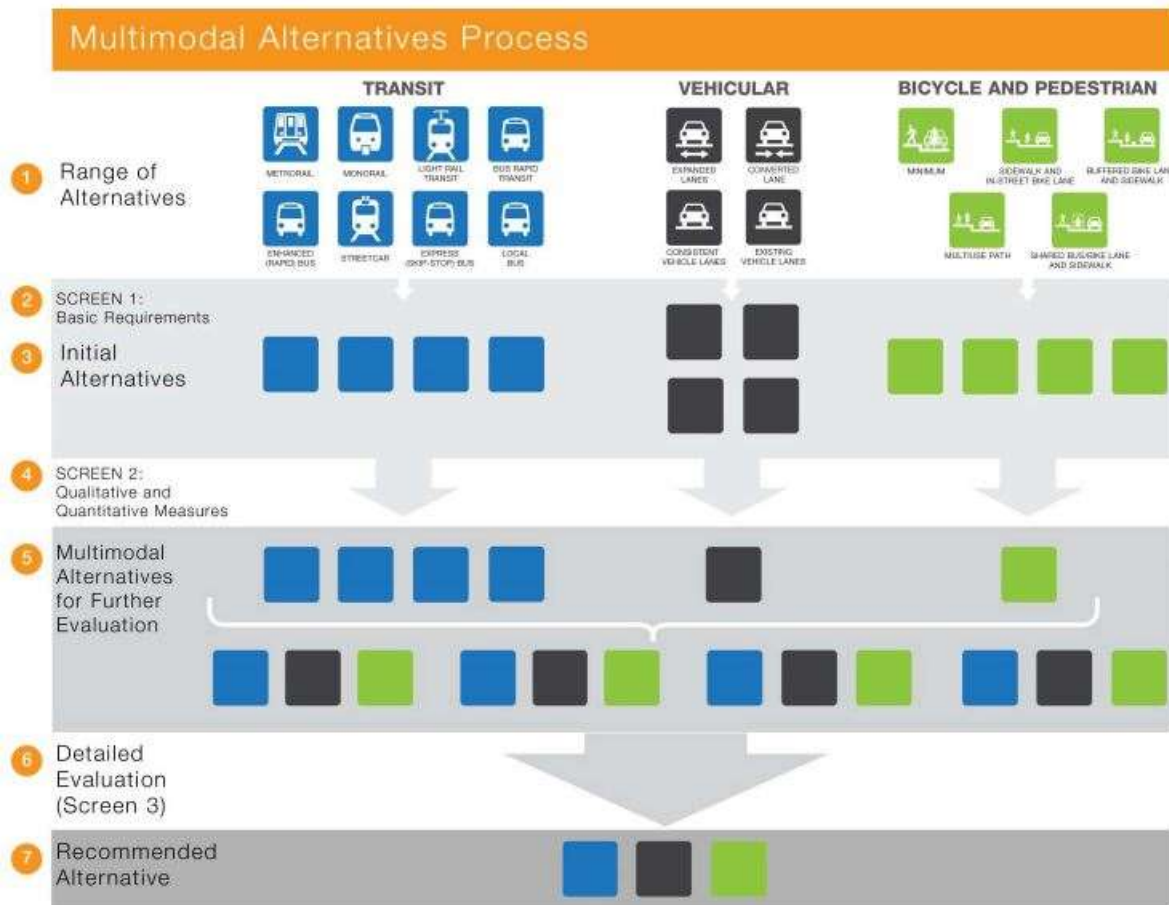
<sup>1</sup> <http://www.drpt.virginia.gov/transit/major-transit-initiatives/major-transit-planning/route-1-multimodal-alternatives-analysis/>

**Figure 2-1: DRPT Multimodal Study (2015) Location**



Source: DRPT (2015)

**Figure 2-2: Overview of DRPT Multimodal Study Alternatives Development and Screening Process**



Source: DRPT (2015)
























The technical evaluation in the DRPT Multimodal Study recommended that Alternative 4 would best meet the stated project goals and objectives (**Figure 2-3**).

In October 2014, the DRPT Multimodal Study Executive Steering Committee Resolution identified Alternative 4 BRT / Metrorail Hybrid as the preferred alternative. The implementation of Alternative 4 would consist of widening Richmond Highway from four travel lanes to six travel lanes where necessary to create a consistent, six-lane cross section along the corridor. A continuous facility for pedestrians and bicyclists would be created along the 15-mile corridor. A BRT system in the median would run from the Huntington VRE Station to Route 123 in Woodbridge. However, within Prince William County, the BRT would be a curb-running system in mixed-traffic. A 3-mile Metrorail Yellow Line extension from Huntington to Hybla Valley was recommended for construction as expeditiously as possible. Phased implementation was recommended with completion of the Richmond Highway widening and BRT in the near term, and completion of the Metrorail Yellow Line extension in the long term.

In May 2015, the Fairfax County Board of Supervisors Resolution endorsed the Executive Steering Committee's recommendation of Alternative 4 BRT / Metrorail Hybrid as the Locally Preferred Alternative

(LPA). The endorsement was contingent upon supportive land use and an achievable funding plan, as contained in the Resolution adopted by the DRPT Multimodal Study Executive Steering Committee. Upon the endorsement, Alternative 4 (recommended alternative) was considered the LPA. The Fairfax County Board of Supervisors Resolution also directed staff to proceed with conducting the environmental studies for Richmond Highway widening and BRT projects (Fairfax County, 2015a).

**Figure 2-3: Evaluation of Alternatives Summary**

Evaluation Factors (Goals)	Alternative 1: BRT-Curb	Alternative 2: BRT-Median	Alternative 3: LRT	Alternative 4: Metrorail-BRT (Hybrid)
Goal 1: Local and Regional Mobility	 0.7	 0.8	 0.8	 1.00
Goal 2: Safety and Accessibility	 0.7	 0.8	 0.8	 0.8
Goal 3A: Economic Development	 0.6	 0.6	 0.6	 0.7
Goal 3B: Cost Effectiveness	 1.0	 0.9	 0.7	 0.5
Goal 4: Community and Health Resources	 0.7	 0.7	 0.7	 0.8
Ability to Meet Project Goals Average	 0.7	 0.8	 0.7	 0.8

Source: DRPT (2015)

### 2.2.2 Design Options Not Retained for Detailed Study

During the earliest phase of preliminary design, several design options were initially considered to implement the Build Alternative. These included making all the improvements to one or the other side of Richmond Highway through the Study Area. Because of the extensive right-of-way needed for these options (**Table 2-1**), impacts to communities would be much greater than if proposed improvements were centered on the existing Richmond Highway. These design options were therefore not advanced for further detailed study.

**Table 2-1: Design Options Right-of-Way Summary**

<b>Design Options</b>	<b>Number of Parcels with Major Impact* by Right-of-Way</b>
Option 1 - Baseline of Construction Along Center of Roadway	23
Option 2 - Baseline of Construction Holding Existing Right-Of-Way Line Along the West Side	61
Option 3 - Baseline of Construction Holding Existing Right-Of-Way Line Along the East Side	45

*\*Major impact is defined as building demolition would be required.*

## **2.3 ALTERNATIVES RETAINED FOR DETAILED STUDY**

Based upon selection of the LPA; the No-Build and one Build Alternative have been retained for detailed study in the EA. The following describes the No-Build and Build Alternative and the ability of the alternatives to meet purpose and need.

### **2.3.1 No-Build Alternative**

The No-Build Alternative includes continued road maintenance and repairs of existing transportation infrastructure within the Study Area. The MWCOG Transportation Improvement Program (TIP) does not have any planned improvement projects listed for Richmond Highway within the Study Area. The MWCOG CLRP includes the current study for widening Richmond Highway, and the independent study of BRT along Richmond Highway from the Huntington Metro Station approximately 3.5 miles north of the Study Area, continuing approximately 8 miles south to the Woodbridge Virginia Railway Express Station. For the purposes of this study, the No-Build Alternative does not include either proposed project. The No-Build Alternative serves as the baseline against which the potential environmental effects of the Build Alternative are compared.

### **2.3.2 Build Alternative**

The Build Alternative is similar to Alternative 4 of the DRPT Multimodal Study. The Build Alternative would include the widening of approximately 2.9 miles of Richmond Highway between Jeff Todd Way and Napper Road in the Village of Mount Vernon in Fairfax County. The road would be widened from a four-lane undivided roadway to a six-lane divided roadway (three travel lanes either side) with bicycle and pedestrian accommodations. The Build Alternative would have six travel lanes, a median, sidewalk, curb and gutter, bicycle facilities to either side of Richmond Highway, and landscaping. The median would be wide enough to accommodate BRT as called for in the DRPT Multimodal Study / Fairfax County Board of Supervisors Resolution. The median would be maintained as a grass strip until the implementation of the BRT. The conceptual design would include a pedestrian sidewalk separated from a bicycle path, however, the exact configuration could change in later design phases. Utilities would be relocated within the conceptual right-of-way for the improvements that would be a maximum 202 feet wide centered on the existing Richmond Highway.

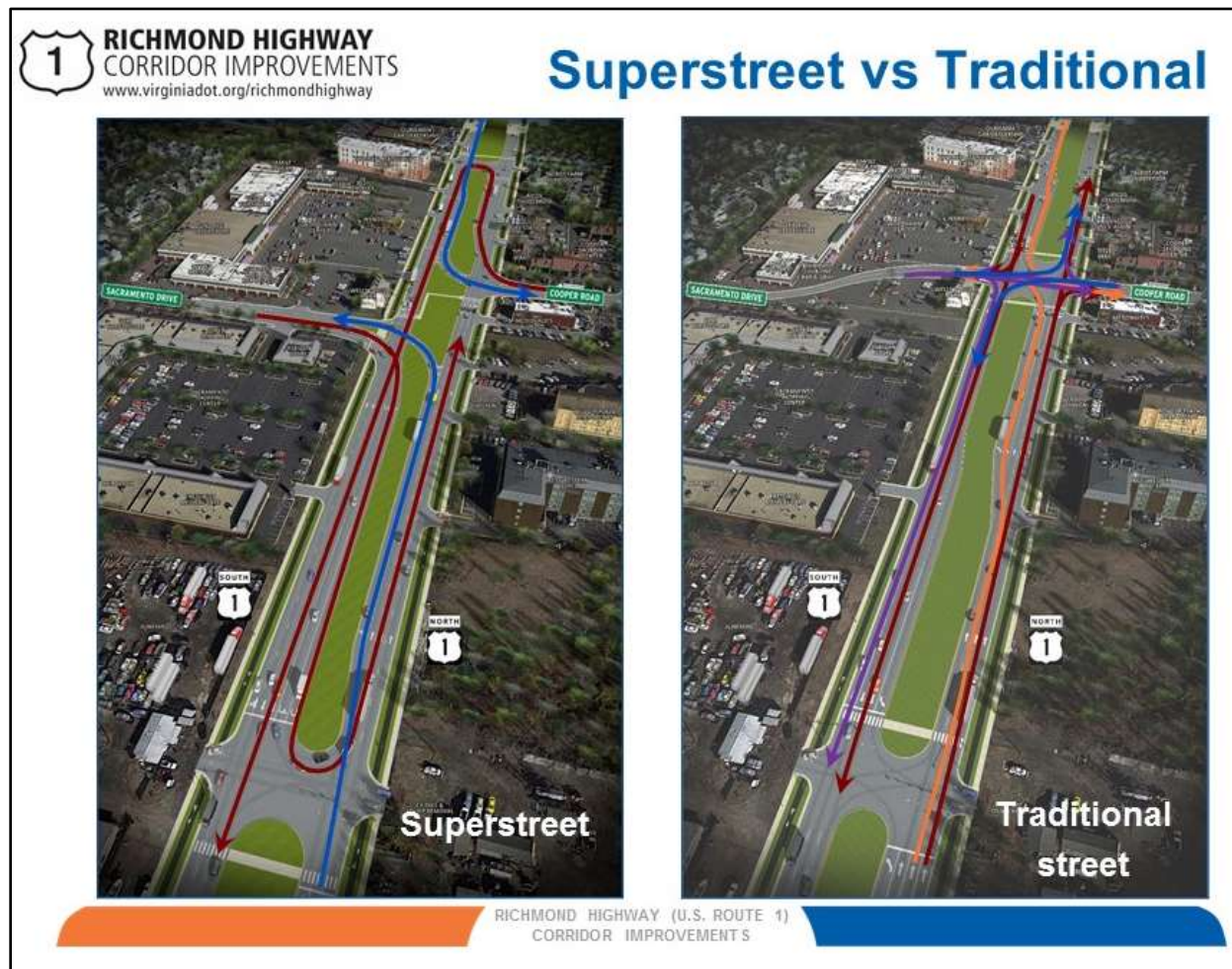
Conceptual design for certain intersections included “superstreet” designs to facilitate traffic turning movements. A superstreet is also known as a restricted crossing U-turn, J-turn, or Reduced Conflict Intersection. **Figure 2-4** shows an example of the superstreet intersection versus traditional intersection



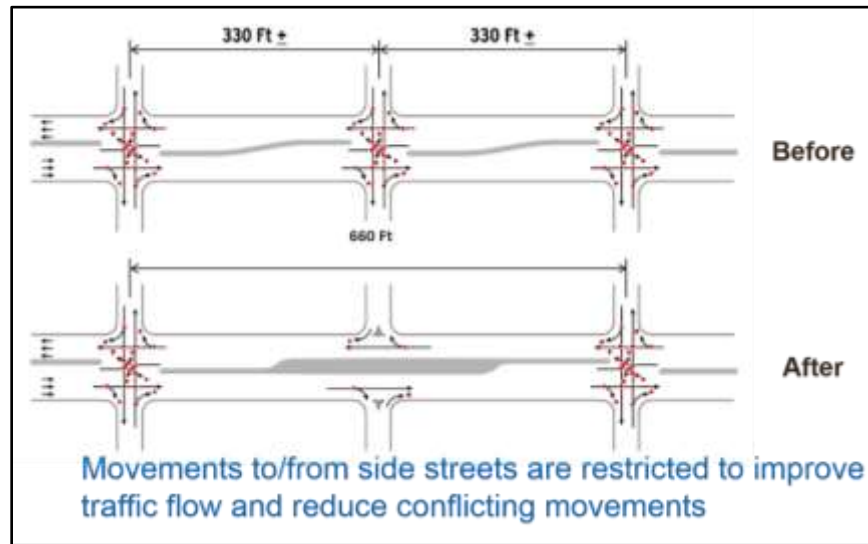
turning movements at Sacramento Drive and Cooper Road. Superstreet intersections were considered at Sacramento Drive, Mohawk Lane and Mount Vernon Highway / Buckman Road intersections. To reduce impacts to the community, superstreet intersections are no longer being pursued.

Access management would be implemented to restrict traffic movements to and from side streets to improve traffic flow and reduce conflicting movements. **Figure 2-5** presents an example of access management measures in plan view.

**Figure 2-4: Superstreet versus Traditional Intersection Design at Sacramento Drive**



**Figure 2-5: Example Access Management Design<sup>1</sup>**



<sup>1</sup> Before design shows signalized intersection spacing at 330 feet, whereas, after design shows 660 feet between signalized intersections

The Build Alternative improvements would include modifications to existing intersecting roadways and bridges, existing drainage systems and stormwater management facilities, and include noise barriers at locations meeting the federal noise abatement criteria and supported by adjacent benefited property owners. To enable maintenance of traffic (MOT) during construction at the Little Hunting Creek Bridge, a new bridge would be built in the median that could also be used for future transit. Certain design details such as stormwater management facilities, access management and noise barriers would be developed in more advanced design phases. The potential impacts of future design modifications to the Build Alternative will be documented in a NEPA reevaluation.

In response to public comments received on the Draft EA and in other community meetings, as well as agency coordination, alternatives to providing pedestrian access at the Dogue Creek and Little Hunting Creek bridges were evaluated as part of the Build Alternative. Providing connections to planned future recreational trails along the two creeks and enhancing pedestrian safety are desired by the County.

Currently, the Richmond Highway crossing at Dogue Creek does not provide pedestrian access either across the bridge, from one side of the highway to the other, or to Dogue Creek on either side of the bridge. The nearest pedestrian crosswalk on Richmond Highway to Dogue Creek is at the signalized Sacramento Drive intersection (approximately 985 feet north). At Little Hunting Creek, sidewalks are on both sides of the bridge, but no pedestrian access is provided to the creek on either side. The nearest crosswalk on Richmond Highway to the Little Hunting Creek Bridge is approximately 80 feet south at the signalized Buckman Road/Mt. Vernon Memorial Highway intersection. Providing new at-grade signalized crossings at the two bridges on the widened highway under the Build Alternative would involve a two-stage crossing of Richmond Highway, increasing vehicle and pedestrian conflicts that reduce safety.

A pedestrian overpass or underpass provides an alternative to crosswalks at signalized intersections, and would involve a single-stage crossing that separates vehicular traffic from pedestrians, improving safety. A pedestrian overpass was considered at Little Hunting Creek and eliminated primarily because of excessive cost. Pedestrian underpasses at Little Hunting Creek and Dogue Creek would be technically



feasible and improve safety by reducing vehicular / pedestrian conflict. Pedestrian underpasses were therefore included in the Build Alternative using planning-level design, and assessed for potential environmental impacts.

### 2.3.3 Ability of Alternatives to Meet Purpose and Need

As documented in **Chapter 1.0**, the purpose of the project improvements under evaluation is based on the following primary need elements: accommodate travel demand and improve safety. Based on these elements of need, **Table 2-2** documents the measures of effectiveness identified for evaluating the alternatives and their ability to meet the identified purpose and need.

**Table 2-2: Measures of Alternative Effectiveness**

Element of Need	Measure in Meeting Need
Accommodate Travel Demand	<ul style="list-style-type: none"> <li>• Increase future traffic volume</li> <li>• Improve future travel time index</li> <li>• Improve future v / c<sup>1</sup> ratio</li> <li>• Accommodate future transit options (planned BRT based on the DRPT Multimodal Study / Fairfax County Board of Supervisors Resolution)</li> </ul>
Improve Safety	<ul style="list-style-type: none"> <li>• Implement access control</li> <li>• Provide adequately spaced signalized intersections</li> <li>• Provide turn lanes where needed</li> <li>• Improve structures at natural stream crossings</li> <li>• Enhance bicycle and pedestrian facilities by providing adequate crosswalks and continuous pedestrian and bicycle facilities to either side of Richmond Highway</li> </ul>

<sup>1</sup> Volume to capacity ratio

This section describes the ability of the No-Build and Build Alternative to address the identified components of the purpose and need based on the measures of effectiveness listed above. The Build Alternative has been developed based on the LPA selected by the DRPT Multimodal Study and Fairfax County described in **Section 2.2.1**. The Build Alternative described in the preceding sections has been retained for detailed evaluation in the EA based on its ability to meet the identified transportation needs in the Study Area as demonstrated by its effectiveness relative to the above listed measures of effectiveness.

The No-Build Alternative does not meet the stated purpose and need. The No-Build Alternative would maintain the current configuration of the Richmond Highway. Per the No-Build traffic forecasts discussed in **Section 1.5.2**, traffic volumes are expected to increase in the future which will lead to more severe congestion and decreased travel reliability during peak travel periods on Richmond Highway in the Study Area. Under the No-Build Alternative, high crash rates would continue as traffic would not be deconflicted by improving access management and wider signal spacing. Natural stream crossings that currently flood during high water events would not be improved, decreasing safety. Further, lack of space for future dedicated BRT in the median as per the DRPT Multimodal Study / Fairfax County Board of Supervisors Resolution, discontinuous sidewalks and lack of bicycle facilities would continue under the No-Build Alternative, decreasing travel options along Richmond Highway and increasing traffic and pedestrian /

bicycle conflict points. As the No-Build Alternative would not address the purpose and need for the project, the following only discusses the ability of the Build Alternative to meet purpose and need.

### **Accommodate Travel Demand**

As identified in **Section 1.4.1** and **1.5.2**, existing and forecasted No-Build travel demand cause severe congestion during peak travel hours in the peak travel directions along Richmond Highway in the Study Area. The additional lane in each direction included as part of the Build Alternative would allow for higher throughput as evidenced in traffic volume estimated for the Build Alternative opening year (2025) compared to current (2016) conditions, and the Build Alternative design year (2045) compared to the 2045 No-Build conditions (**Table 2-3**). See the *Richmond Highway Future Conditions Traffic Report* for a detailed description of the methods used to forecast opening and design year traffic conditions of the Build Alternative.

**Table 2-3: Existing No-Build, Opening Year (2025) Build Alternative, 2045 No-Build and Build Alternative Design Year (2045) Traffic Volumes**

Year	Richmond Highway Traffic Section	Average Annual Daily Traffic (AADT)	Average Weekday Daily Traffic Volume (AAWDT)	Northbound Peak Hour AM / (PM)	Southbound Peak Hour AM / (PM)
Existing 2016 No-Build	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	38,645	39,855	1,725 (1,485)	1,160 (1,570)
Opening Year 2025 – Build Alternative	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	52,255	53,890	2,377 (2,016)	1,751 (2,112)
2045 No-Build Alternative	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	53,085	54,745	2,370 (2,040)	1,595 (2,155)
Design Year 2045 – Build Alternative	Mt Vernon Memorial Hwy (VA 235) / Jeff Todd Way to Mt Vernon Hwy (VA 235) / Buckman Rd	68,330	70,465	2,800 (2,636)	2,064 (2,762)

**Table 2-4** provides the travel time index (TTI) from Jeff Todd Way / Mount Vernon Memorial Highway (VA 235) to Buckman Road / Mount Vernon Highway (VA 235) intersections along Richmond Highway under No-Build and Build Alternative scenarios. Under the opening year (2025) Build Alternative, southbound

TTI would be slightly longer than existing TTI in both the morning and evening peak travel periods. Similarly, southbound morning and evening peak travel-time TTI under the design year (2045) Build Alternative would be longer compared to the 2045 No-Build Alternative. This is attributed to the proposed signal timing changes that are balanced to benefit north and southbound traffic flow in the overall Richmond Highway corridor in the Study Area.

**Table 2-4: Travel Time Indices (TTI) for Existing (2016), Opening Year (2025) Build, 2045 No-Build and Build Alternative Design Year (2045)**

Travel Direction and Peak Hour		Existing 2016 TTI	Opening Year (2025) Build Alternative TTI	Design Year (2045) No-Build Alternative TTI	Design Year (2045) Build Alternative TTI
Southbound	AM Peak <sup>1</sup>	1.6	1.7	1.7	2.0
Northbound	AM Peak	1.4	1.5	2.5	1.6
Southbound	PM Peak <sup>2</sup>	1.3	1.9	2.5	2.7
Northbound	PM Peak	1.7	1.5	15.3	2.2

<sup>1</sup>AM Peak is 7:15 – 9:15 AM

<sup>2</sup>PM peak is 3:15 – 6:15 PM

A  $v/c$  ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are typically not expected to experience significant queues and delays. Volume to capacity ratios shown in **Table 2-5** indicate the opening year (2025) Build Alternative would improve northbound during AM and PM peak travel as compared to existing (2016) conditions, but southbound traffic would have higher  $v/c$  during the morning and evening peak travel periods. A similar pattern occurs comparing the  $v/c$  in the design year (2045) of the Build Alternative to the 2045 No-Build conditions. This is due to balancing signal timing for the benefit of north and southbound traffic throughput through the entire Richmond Highway corridor in the Study Area. **Table 2-5** also shows that the No-Build design year (2045)  $v/c$  is expected to improve over existing (2016) conditions. This is because the Richmond Highway widening project extending south from the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection through Fort Belvoir would be completed by 2045, including two northbound left turn-lanes and a continuous exclusive right turn-lane at the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection. That project was recently completed in Summer 2017. With the increase in lane capacity at the intersection, traffic operations are expected to improve in the future.

**Table 2-5: Volume to Capacity Ratio (v / c) for Existing (2016), Opening Year (2025) Build Alternative, 2045 No-Build and Build Alternative Design Year (2045)**

Location	Existing 2016 AM / PM v / c	Opening Year (2025) Build Alternative AM / PM v / c	2045 No-Build Alternative AM / PM v / c	Design Year (2045) Build Alternative AM / PM v / c
Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way	0.98 (1.08)	0.64 (0.71)	0.91 (0.96)	0.81 (0.92)
Mount Vernon Highway (VA 235) / Buckman Road	1.26 (0.89)	0.64 (0.54)	1.44 (1.14)	0.76 (0.71)

Level of service (LOS) provides a comparative measure of the traffic performance of roads through a grading from A to F. Under the Design-Year Build Alternative, all the study intersections and mainline Richmond Highway approaches are expected to operate at LOS E or better (**Table 2-6**). During AM and PM peak traffic hours, approximately 14 percent of the side street approaches are expected to fail at lower thresholds of LOS F. When compared to the 2045 No-Build conditions, LOS at all the study intersections is expected to be similar or better, with one exception. The operations at the Richmond Highway intersection with Frye Road would slightly degrade to LOS D during the AM peak hours, when compared to LOS C under the 2045 No-Build Alternative. This is attributed to the additional U-turns along Richmond Highway, which are a result of restricted left-turns from access driveways to the intersection vicinity.

**Table 2-6: Level of Service Rankings at Key Study Area Intersections for Existing (2016), Opening Year (2025) Build Alternative, 2045 No-Build and Build Alternative Design Year (2045)**

Intersection	Existing 2016 Peak LOS AM / (PM)	Opening Year (2025) Build Alternative Peak LOS AM / (PM)	2045 No-Build Alternative Peak LOS AM / (PM)	Build Alternative 2045 Peak LOS AM / (PM)
Richmond Highway at Ladson Lane	B / (D)	A / (B)	D / (F)	B / (D)
Richmond Highway at Mt Vernon Highway / Buckman Road	D / (D)	B / (C)	F / (F)	C / (D)
Richmond Highway at Janna Lee Avenue	B / (A)	C / (D)	E / (F)	D / (D)
Richmond Highway at Russell Road	C / (B)	A / (B)	D / (E)	D / (D)

Intersection	Existing 2016 Peak LOS AM / (PM)	Opening Year (2025) Build Alternative Peak LOS AM / (PM)	2045 No-Build Alternative Peak LOS AM / (PM)	Build Alternative 2045 Peak LOS AM / (PM)
Richmond Highway at Mohawk Lane	B / (B)	C / (C)	C / (F)	A / (C)
Richmond Highway at Buckman Road / Radford Avenue	A / (B)	C / (C)	B / (F)	B / (B)
Richmond Highway at Frye Road	B / (B)	B / (B)	C / (F)	D / (D)
Richmond Highway at Lukens Lane	B / (B)	B / (B)	C / (F)	C / (D)
Woodlawn Court	N / A <sup>1</sup>	A / (B)	N / A <sup>1</sup>	B / (C)
Richmond Highway at Cooper Road	B / (C)	D / (D)	C / (E)	C / (B)
Richmond Highway at Sacramento Drive	B / (C)	A / (B)	D / (F)	B / (B)
Sacramento Drive Southern U-Turn	N / A	B / (C)	N / A	A / (B)
Richmond Highway at Mt Vernon Memorial Highway / Jeff Todd Way	D / (D)	C / (C)	F / (F)	E / (E)

<sup>1</sup>Woodlawn Court is not currently signalized.

Under the Build Alternative, space would be set aside in the median for planned BRT facilities along Richmond Highway through the Study Area, in accordance with Fairfax County's Comprehensive Plan to accommodate future travel demand. None of the Build Alternative design features would preclude accommodating future transit (which would be BRT, based on the DRPT Multimodal Study and Fairfax County Board of Supervisors Resolution). In May 2016, the 2015 CLRP was amended to include BRT along Richmond Highway from the Huntington Metro Station approximately 3.5 miles north of the Study Area, through the Study Area, continuing approximately 8 miles south to the Woodbridge VRE Station. This independent transit study is currently underway.

### **Improve Safety**

Under the Build Alternative, safety would be improved by implementing access control, providing adequately spaced signalized intersections, providing turn lanes where needed, improving structures at natural stream crossings, and enhancing pedestrian and bicycle facilities.

Access control would be improved by the Build Alternative by providing adequate spacing between signals, providing turn lanes where needed, and restricting traffic movements to and from side streets to improve traffic flow and reduce conflicting movements that increases safety.



Improving structures at major natural stream crossings as proposed would increase elevations compared to existing structures, which reduces flooding on Richmond Highway.

The Build Alternative would enhance bicycle and pedestrian facilities in the Study Area by providing adequate crosswalks on Richmond Highway and continuous pedestrian and bicycle facilities to either side of the highway and for pedestrian underpasses beneath the Dogue Creek and Little Hunting Creek bridges. This would increase safety by reducing conflict points between traffic and pedestrians / bicyclists.

### **Conclusion**

Based on the above findings, the Build Alternative meets the measures of alternative effectiveness. The Build Alternative therefore would address the purpose and need for the project as described in **Chapter 1**.

### 3. ENVIRONMENTAL CONSEQUENCES

#### 3.1 INTRODUCTION AND OVERVIEW OF ENVIRONMENTAL ISSUES

This chapter presents existing conditions for each of the resources identified within the Study Area, and analyzes the environmental consequences resulting from implementation of the alternatives evaluated. More detailed information is provided in respective technical reports:

- *Richmond Highway Corridor Improvements: Socioeconomic and Land Use Technical Report (VDOT, 2017a)*
- *Richmond Highway Corridor Improvements: Natural Resources Technical Report (VDOT, 2017b)*
- *Richmond Highway Corridor Improvements: Rare, Threatened, and Endangered Species Technical Report (VDOT, 2017c)*
- *Richmond Highway Corridor Improvements: Air Quality Analysis Technical Report (VDOT, 2017d)*
- *Richmond Highway Corridor Improvements: Noise Analysis Technical Report (VDOT, 2017e)*
- *Richmond Highway Corridor Improvements: Hazardous Materials Assessment Technical Report (VDOT, 2017f)*
- *Richmond Highway Corridor Improvements: Indirect and Cumulative Effects Technical Report (VDOT, 2017g)*

The Study Area encompasses approximately a 2.9-mile section of the Richmond Highway corridor between Route 235 (Mount Vernon Memorial Highway – South) to Sherwood Hall Lane. The Study Area is generally defined as 300 feet on either side of the existing Richmond Highway centerline, with additional areas extending as much as 1,000 feet for access management.

The No-Build Alternative is not expected to result in environmental effects, except as noted in the following sections.

**Table 3-1** summarizes the environmental conditions within the Study Area and the estimated potential effects of the Build Alternative. The direct effects of the Build Alternative are assessed within the limits of disturbance (LOD) established by conceptual design. The planning level LOD includes the grading limits, permanent right-of-way and temporary right-of-way areas needed to construct the Build Alternative. This planning level LOD would be refined as design advances through more detailed design and permitting following a FHWA NEPA decision. Indirect and cumulative effects are assessed within broader study areas established for socioeconomic, natural, and cultural resources.

**Table 3-1: Environmental Resources and Build Alternative Impact Summary**

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
Land Use and Locality Plans	Study Area land use is primarily commercial followed by residential; recreation and open space; institutional, government, and utilities; and industrial. 3 CBCs <sup>1</sup> are within the Study Area.	The Build Alternative would require approximately 22 acres of primarily commercial land be converted to transportation use. Refer to <b>Section 3.2</b> for more information.	No Change
Communities and Community Facilities	The Study Area includes 5 communities: Mount Vernon, Woodlawn, Hybla Valley, Groveton and Fort Hunt. Also, within the Study Area are 24 community facilities including 4 schools, a post office, 4 parks, 8 religious' institutions, 5 community centers / non-profits, and 2 government buildings.	The Build Alternative is located along an existing corridor and would not create a new physical barrier to inter-community interaction or cause adverse impacts to community connectivity or cohesion. The Build Alternative would potentially require 6 residential and 38 commercial building displacements on 42 parcels as well as the potential full right-of-way acquisition of 2 religious facilities. The potentially affected properties are located along the edge of the communities adjacent to Richmond Highway, lessening potential impacts to community cohesion. Refer to <b>Section 3.3</b> for more information.	The Build Alternative would potentially require displacing 6 residential parcels with 5 single-family homes and 12 trailers; 32 business parcels with 46 individual businesses, and 2 religious community facilities on 2 parcels.
Bike Paths and Recreational Trails	Bike routes within the Study Area are on local streets and along Richmond Highway. No bike lanes, shared use paths, or cycle tracks are located within the Study Area.	The Build Alternative would provide enhanced bicycle and pedestrian facilities on both sides of Richmond Highway. Access to Richmond Highway for bicycling may be impacted by temporary closures or detours during construction. Refer to <b>Section 3.3</b> for more information.	Pedestrian underpasses were added to the Build Alternative to provide safer crossings at Dogue Creek Bridge and Little Hunting Creek and connect to future recreational trails planned by Fairfax County. Fairfax County Department of Transportation has committed to providing 24-hour security, lighting, a call box, trash receptacles, and increased police patrols, along with ongoing maintenance. These measures would address many community concerns and mitigate the potential safety effects of the underpasses. Coordination with concerned organizations and County

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
			officials is ongoing and additional design changes to the proposed pedestrian underpasses may occur during advanced design. VDOT and Fairfax County Department of Transportation will ensure the community is heard, continuing ongoing outreach and providing additional meeting opportunities to discuss the potential underpasses with local residents.
Socioeconomics and Environmental Justice	<p>Based on 2010 Census data, approximately 30,934 residents live in the Census block groups within the Study Area. Approximately 93% of the labor force in the Study Area is employed. Median household income within the study Census block groups is \$67,193. Minority populations are identified in 14 of the 15 Study Area Census block groups.</p> <p>No low-income populations were identified at the Census block group level; however, a low-income population was identified at the Spring Garden Apartments south of Richmond Highway in the northeastern Study Area.</p> <p>An estimated 11,424 housing units are in the Study Area Census block groups, mostly occupied (92.9 %) and owner-occupied (52%). Up to 909 business establishments are within the zip codes encompassed by the Study Area, of which 55.1% have from 1 to 4 employees.</p>	<p>No substantial impact to population, employment, income or housing would occur under the Build Alternative. Approximately 39 residential, 133 commercial and 10 community facility parcels are in the LOD. The Build Alternative would potentially require displacing 40 housing units on six residential parcels, 38 commercial buildings with 25 involving total parcel acquisitions, total acquisition of one undeveloped parcel zoned commercial, and two community facilities on two total acquisition parcels. All right-of-way acquisitions would be conducted under the Uniform Relocation Assistance and Real Property Policies Act of 1970. Fifteen housing units on six residential parcels could be displaced in Census block groups containing minority populations, 24 housing units could be displaced from one residential parcel at the Spring Garden Apartments constituting a low-income population, and one housing unit from one residential parcel could be displaced in Census block group 4161.00 BG 1 that does not meet the thresholds for minority or low-income populations. The non-minority resident</p>	<p>The Build Alternative would potentially require displacing 17 housing units on 6 residential parcels, 46 businesses on 32 parcels and 2 religious community facilities on 2 parcels. All right-of-way acquisitions would be conducted under the Uniform Relocation Assistance and Real Property Policies Act of 1970. Sixteen housing units on 5 residential parcels could be displaced in Census block groups containing minority populations, while 1 housing unit would be displaced in a non-EJ Census block group. The non-minority resident population within these minority population block groups ranges from 15.9 to 84.1%. Therefore, it is probable that not all displacements would be borne by minorities and the impact would not be disproportionate and adverse. No displacements in the low-income population area at Spring Garden Apartments complex would occur. Refer to <b>Section 3.3</b> for more information.</p> <p>Residents in minority population areas at the Harmony Place Trailer Park expressed concerns and the New Gum Springs Civic Association, representing residents living near the Little</p>

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
		<p>population within these minority population block groups ranges from 15.9 to 84.1%. Therefore, it is probable that not all displacements would be borne by minorities and the impact would not be disproportionate and adverse. Although 24 housing units where a low-income population resides at the Spring Garden Apartment complex may be displaced under the Build Alternative, other apartments and single-family housing would be similarly impacted in areas not meeting the definition of a low-income population; thus, the impact to low-income populations would not be disproportionate. Refer to <b>Section 3.3</b> for more information.</p>	<p>Hunting Creek Bridge, does not support providing a pedestrian underpass at Little Hunting Creek. The Mount Vernon Council of Citizens' Association, representing residents throughout the Study Area, also expressed concerns with the underpasses proposed at Dogue Creek and Little Hunting Creek. Concerns expressed about both underpasses include increased crime, personal safety issues, increased litter, vandalism, maintenance issues, enabling camping, unsanitary conditions, and flooding. Measures to provide 24-hour security such as cameras were requested. Fairfax County has committed to 24-hour security, lighting, and increased police patrols, along with ongoing maintenance of the underpasses thereby mitigating concerns. Providing pedestrian underpasses as proposed by the Build Alternative would not result in any residential or other relocations, minimizing impacts to minority populations. The underpasses are not anticipated to have a disproportionate high and adverse effect on minority or low income populations. Coordination with concerned organizations and county officials is ongoing and additional design changes to the proposed pedestrian underpasses may occur during advanced design. VDOT and Fairfax County Department of Transportation will continue ongoing outreach and providing additional meeting opportunities to discuss the potential underpasses with local residents. Any associated changes in effects to Environmental</p>



Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
			Justice populations would be assessed in a NEPA Reevaluation.
Streams and Water Quality	A total of 2,968.5 linear feet of streams have been identified in the study area and are in Fairfax County Environmental Quality Corridors (EQC). Three perennial streams are located within the Study Area. Two of these streams (1,808.3 linear feet) are designated as “impaired waters” under Section 303(d) of the Clean Water Act.	The Build Alternative would impact up to 963.2 linear feet of perennial stream. Refer to <b>Section 3.4</b> for more information.	The Build Alternative would impact up to 963.1 linear feet / 0.67 acre of perennial stream that are also in Fairfax County Environmental Quality Corridors. Refer to <b>Section 3.4</b> for more information.
Wetlands	A total of 1.2 acres of wetlands have been delineated within the Study Area.	The Build Alternative would impact 0.2 acre of wetlands. Refer to <b>Section 3.4</b> for more information.	No Change
Aquifers / Water Supply	No public water resources were found within the Study Area. The Study Area is located within the Eastern Groundwater Management Area in Virginia.	As no public water resources are within the LOD, no impacts would occur to these resources. Roadway cuts are not anticipated to encounter the groundwater table. Refer to <b>Section 3.4</b> for more information.	No Change
Terrestrial Wildlife / Habitat	Expanses of terrestrial habitat in the Study Area are rare and fragmented as residential, commercial, industrial, government / military areas are common, resulting in low quality edge habitat. Natural areas that remain are within stream corridors and Fairfax County Parks. No wildlife refuges or wildlife management areas are located within the Study Area. Wildlife species present include those most adapted to dense urban and suburban development while species in the stream corridors are more varied.	The Build Alternative would continue to pose a barrier to wildlife movement. However, incrementally increasing the width of the roadway would not likely substantially exacerbate existing conditions. Refer to <b>Section 3.4</b> for more information.	No Change

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
Anadromous Fish	Dogoe Creek and the Potomac River are confirmed Anadromous Fish use streams and Little Huntington Creek is a potential Anadromous Fish use stream. These anadromous fish confirmed use areas and potential use areas do not extend upstream into the Study Area; however, anadromous fish have been surveyed upstream of the Study Area in Dogoe Creek and Little Hunting Creek.	No VDGIF-confirmed or potential Anadromous Fish Use Areas are within the LOD, therefore, no direct impacts to these areas would occur under the Build Alternative. Refer to <b>Section 3.4</b> for more information.	No Change
Rare, Threatened, and Endangered Species	2 species currently federally listed as threatened or endangered that are known to occur or have potential to occur within or near the Study Area include the Atlantic Sturgeon ( <i>Acipenser oxyrinchus</i> ) and the Northern Long-eared Bat ( <i>Myotis septentrionalis</i> ). State threatened or endangered species potentially within the Study Area include the Little Brown Bat ( <i>Myotis lucifigus lucifigus</i> ), Tri-colored Bat ( <i>Perimyotis subflavus</i> ), Wood Turtle ( <i>Glyptemys insculpta</i> ), and Peregrine Falcon ( <i>Falco peregrinus</i> ). Bald eagles ( <i>Haliaeetus leucocephalus</i> ) are protected under the Bald and Golden Eagle Protection Act. The Potomac River shoreline from Fort Belvoir until Dogoe Creek is a bald eagle concentration area for yearly periods spanning May 15 <sup>th</sup> to August 31 <sup>st</sup> and December 15 <sup>th</sup> to March 15 <sup>th</sup> . Known eagle nests are along the Potomac River and its embayments.	Surveys for protected species may be required if potential habitat is identified in the Build Alternative LOD. Although the Build Alternative could potentially affect threatened and endangered species and their habitat, mitigation measures would be developed as necessary following coordination with the VDCR <sup>2</sup> , VDGIF <sup>3</sup> , and USFWS <sup>4</sup> prior to construction. Mitigation measures may include use of time-of-year restrictions on construction, contractor training in recognizing and avoiding threatened, and endangered species and their habitats, and restoration of habitat. A known bald eagle nest is within the potential noise buffer area of the Build Alternative and may require an Eagle Act permit. Refer to <b>Section 3.4</b> for more information.	No Change

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
Floodplains	26.7 acres of FEMA designated 100-year floodplains are within the Study Area.	The Build Alternative would involve 8.6 acres of encroachment within regulated floodplains, mostly perpendicular crossings. The actual encroachment may be different based upon the total extent of fill required for construction and the use of bridges at the major water crossings. The Build Alternative would not pose a flooding risk. The Build Alternative would design water crossings consistent with procedures for the location and hydraulic design of highway encroachments on floodplains contained in 23 CFR § 650 Subpart A. No substantially adverse impact to natural and beneficial floodplain values would occur. The Build Alternative is not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life. Refer to <b>Section 3.4</b> for more information.	The Build Alternative would involve 8.9 acres of encroachment within regulated floodplains, mostly perpendicular crossings.
Chesapeake Bay Preservation Areas	Within the Study Area, 31.3 acres of RPAs <sup>5</sup> are concentrated adjacent to the Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek stream corridors.	11 acres of RPAs are within the LOD, concentrated along the stream corridors. Public roads and their appurtenant structures are conditionally exempt from regulation under 8VAC25-830-150. If the exemption conditions would be met by the Build Alternative, no further analysis is required in this EA. Refer to <b>Section 3.4</b> for more information.	11.6 acres of RPAs are within the LOD, concentrated along the stream corridors. Public roads and their appurtenant structures are conditionally exempt from regulation under Chapter 118 Article 5-2 of the Fairfax County Code of Ordinances and 8VAC25-830-150. If the exemption conditions would be met by the Build Alternative, no further analysis is required in the EA. Refer to <b>Section 3.4</b> for more information.
Virginia Coastal Zones	The Study Area is located within Virginia's Coastal Zone. Since the proposed project would receive federal funding for construction and require federal approval, the project must be consistent with the	VDOT would submit a description of how the Build Alternative construction would be consistent with the applicable Enforceable Regulatory Programs comprising Virginia's CZMP to VDEQ <sup>7</sup> . This process would be	No Change

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
	applicable Enforceable Regulatory Programs comprising Virginia's CZMP <sup>6</sup> .	completed during the design and permitting phase if the Build Alternative was implemented. Refer to <b>Section 3.4</b> for more information.	
Topography and Soils	The Study Area is in the Coastal Plain that consists of unconsolidated sand, silt and clay, and gravel deposited by ancient oceans and rivers. The overall drainage pattern in the Study Area is to the southeast. The soils in the Study Area include some hydric soils and two types of highly-erodible soils. The latter includes the Kingstowne-Sassafras-Marumsc complex comprising 0.3% and the Sassafras-Marumsc complex is 0.1% of the Study Area.	The Build Alternative could encounter 2 highly erodible soil types; however, over 70% of the soils in the Study Area are urban soils and present a low to moderate erosion potential. The topography is nearly level, thus deep cuts or fills are not anticipated under the Build Alternative. A Stormwater Pollution Protection Plan would effectively manage highly erodible soil types in the LOD. Refer to <b>Section 3.4</b> for more information.	No Change
Invasive Species	Executive Order 13112 Invasive Species (as amended) directs no federal agency can authorize, fund, or carry out any action that it believes is likely to cause or promote the introduction or spread of invasive species. Invasive species are non-native (alien, exotic or non-indigenous) plants, animals or diseases causing economic or environmental harm or harm to human health. Common invasive plant species in the Study Area include tree-of-heaven ( <i>Ailanthus altissima</i> ), multiflora rose ( <i>Rosa multiflora</i> ), and Japanese honeysuckle ( <i>Lonicera japonica</i> ). Although not observed in the Study Area, several species of rodents, European starling ( <i>Sturnus vulgaris</i> ) and English sparrow	The Build Alternative has the potential to spread invasive species. While most of the area within the LOD is previously disturbed, the disturbance of natural areas as well as the removal and transfer of fill from borrow sites within the LOD or offsite locations could spread invasive species. This potential is minimized by adherence to VDOT's Road and Bridge Specifications requiring prompt seeding of disturbed areas and mixes tested in accordance with the Virginia Seed Law and VDOT's standards and specifications. Refer to <b>Section 3.4</b> for more information.	No Change

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
	( <i>Passer domesticus</i> ) and other invasive animal species could occur.		
Submerged Aquatic Vegetation (SAV)	Existing SAV beds occur downstream, outside of the Study Area within Dogue Creek and the Potomac River.	No SAV are within the Study Area or LOD, therefore no direct effects to SAV would occur under the Build Alternative. Refer to <b>Section 3.4</b> for more information.	No Change
Archaeological Resources	A Phase I survey was performed to identify archaeological resources within the APE <sup>8</sup> . 3 previously identified archaeological sites were investigated, of which 2 have been destroyed by development, and the remaining site found not eligible for the NRHP <sup>9</sup> by the SHPO <sup>10</sup> / VDHR <sup>11</sup> . No other archaeological sites were found.	The Build Alternative would not affect any archaeological historic properties. Refer to <b>Section 3.5</b> for more information.	No Change
Architectural Resources	A Phase I survey for architectural resources found 159 resources, of which 4 had been previously demolished since recordation. 4 of the remaining 155 resources, are either eligible for, potentially eligible for, or listed on the NRHP. In addition, Woodlawn Plantation is also a designated National Historic Landmark.	<p>The Build Alternative is within the viewshed of Woodlawn Plantation, Woodlawn Cultural Landscape Historic District, and the Sharpe Stable Complex. However, previous roadway and other development has diminished the historic setting and feeling of these resources. Although the Build Alternative would have an indirect effect to these historic properties, the effect would not be adverse.</p> <p>The Build Alternative would impact the circular drive and parking area along the OMVHS<sup>12</sup> (NRHP-eligible) frontage to Richmond Highway. Previous modifications to this area have diminished its physical integrity such that it no longer conveys its historic significance. In recognition of the importance of the School to the community, VDOT commits to install 2</p>	No Change



Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
		interpretive signs and conduct an oral history project disseminated to the public. Based on these commitments, Fairfax County and the SHPO has concurred that no adverse effect to historic properties would occur under the Build Alternative. Refer to <b>Section 3.5</b> for more information.	
Air Quality	The USEPA Green Book, which lists non-attainment, maintenance, and attainment areas, shows that Fairfax County is designated as non-attainment for the 2008 8-hour ozone standard, and as an attainment area for all other NAAQS <sup>13</sup> .	Carbon monoxide (CO) – All intersections are screened out under the 2016 FHWA-VDOT Programmatic Agreement for CO or by using the “weight of evidence” approach. Mobile Source Air Toxics (MSAT) – The Build Alternative has a low potential for MSAT effects. Refer to <b>Section 3.6</b> for more information.	No Change
Noise	The measurement of individual, 1-minute equivalent sound levels (Leqs) in the Study Area ranged from a low of 38 a-weighted sound decibels (dBA) to a high of 71 dBA.	Residential noise impacts are predicted to occur under the Build Alternative. To mitigate these impacts, a total of 0.38 miles of barriers have been preliminarily identified as being feasible and reasonable. These noise barriers would benefit 57 of the impacted receptors, as well as 59 not impacted receptors.	No Change
Hazardous Materials	Within the 1-mile search radius from Richmond Highway, 61 sites were given a priority ranking associated with the potential risk for mobilizing hazardous or contaminated substances before, during and after project construction.	Contaminants from 19 properties with high to moderate contaminant risks could migrate into the Build Alternative LOD. Prior to acquisition of right-of-way and construction, a Phase I ESA <sup>14</sup> should be conducted. Refer to <b>Section 3.8</b> for more information.	No Change
Indirect Effects and Cumulative Impacts	Past and present actions have been both beneficial and adverse to socioeconomic resources and land use within the Study Area. Past development has produced a steady decline in natural and historic resources conditions, and cultural	While some indirect effects and cumulative impacts would occur under the Build Alternative, no significant issues were identified. See <b>Section 3.11</b> for more information.	No Change

Resources	Resource Summary / Inventory	Draft EA Potential Impact of the Build Alternative	Revised EA Impact Changes of the Build Alternative
	resources have been continuously created and destroyed by succeeding developments over time.		
Section 4(f) and 6(f) Properties	7 Section 4(f) resources are within the Study Area. These include 3 parks and 4 historic properties.	No Section 4(f) use would occur under the Build Alternative at the 3 parks in the Study Area as no permanent or temporary right-of-way would be acquired and no constructive use would occur. The SHPO / VDHR has concurred that no adverse effect from the Build Alternative would occur to historic properties. The FHWA intends to make a <i>de minimis</i> finding for the OMVHS resource. Refer to <b>Section 3.12</b> for more information.	No Change

<sup>1</sup> Community Business Centers

<sup>2</sup> Virginia Department of Conservation and Recreation

<sup>3</sup> Virginia Department of Game and Inland Fisheries

<sup>4</sup> US Fish and Wildlife Service

<sup>5</sup> Resource Protection Areas

<sup>6</sup> Coastal Zone Management Program

<sup>7</sup> Virginia Department of Environmental Quality

<sup>8</sup> Area of Potential Effect

<sup>9</sup> National Register of Historic Places

<sup>10</sup> State Historic Preservation Officer

<sup>11</sup> Virginia Department of Historic Resources

<sup>12</sup> Original Mount Vernon High School

<sup>13</sup> National Ambient Air Quality Standards

<sup>14</sup> Environmental Site Assessment

## 3.2 LAND USE AND LOCALITY PLANS

### 3.2.1 Existing Conditions

The Study Area is primarily comprised of the well-established communities of Woodlawn and Mount Vernon, and to a lesser extent, Hybla Valley, Fort Hunt, and Groveton. These communities are defined by their extensive residential land use with commercial land use focused around the Richmond Highway corridor. The Study Area is primarily commercial followed by residential; recreation and open space; institutional, government, and utilities; and industrial as shown in **Table 3-2**. No agricultural or industrial land use is within the Study Area.

**Table 3-2: Study Area Existing Land Use (2016)**

Land Use	Acres	Percent of Study Area Land Use
Agricultural	0.0	0.0%
Commercial	183.0	47.0%
Residential	102.0	26.2%
Industrial	0.0	0.0%
Institutional, Government, Utilities	41.5	10.7%
Recreation and Open Space	62.7	16.1%
<b>Total</b>	<b>389.2</b>	<b>100.0%</b>

(Fairfax County, 2016a)

The Study Area is within the Mount Vernon Planning District. Fairfax County's 2017 Comprehensive Plan recommends future land development through infill, redevelopment, and revitalization in areas targeted for growth. The Plan was amended in 2017 with the Embark Richmond Highway (Plan Amendment 2015-IV-MV1). This plan makes land use recommendations based on six Community Business Centers (CBC) within the Mount Vernon Planning District (**Figure 3-1**). Three of these CBCs are within the Study Area: Hybla Valley / Gum Springs, South County Center, and Woodlawn. The areas between these CBCs are classified as Suburban Neighborhoods Areas. Development recommendations for the CBCs and Suburban Neighborhoods are intended to foster revitalization, redevelopment, and creation of distinctive urban environments (Fairfax County, 2013a).

The amended plan (2017-10 and 2017 P-02) recommends widening Richmond Highway to accommodate a median-running BRT system guideway, improving access management, design of the roadway as a complete street with six travel lanes, and create continuous bicycle and pedestrian facilities on both sides, along the entire length of the Richmond Highway Corridor.

### 3.2.2 Environmental Consequences

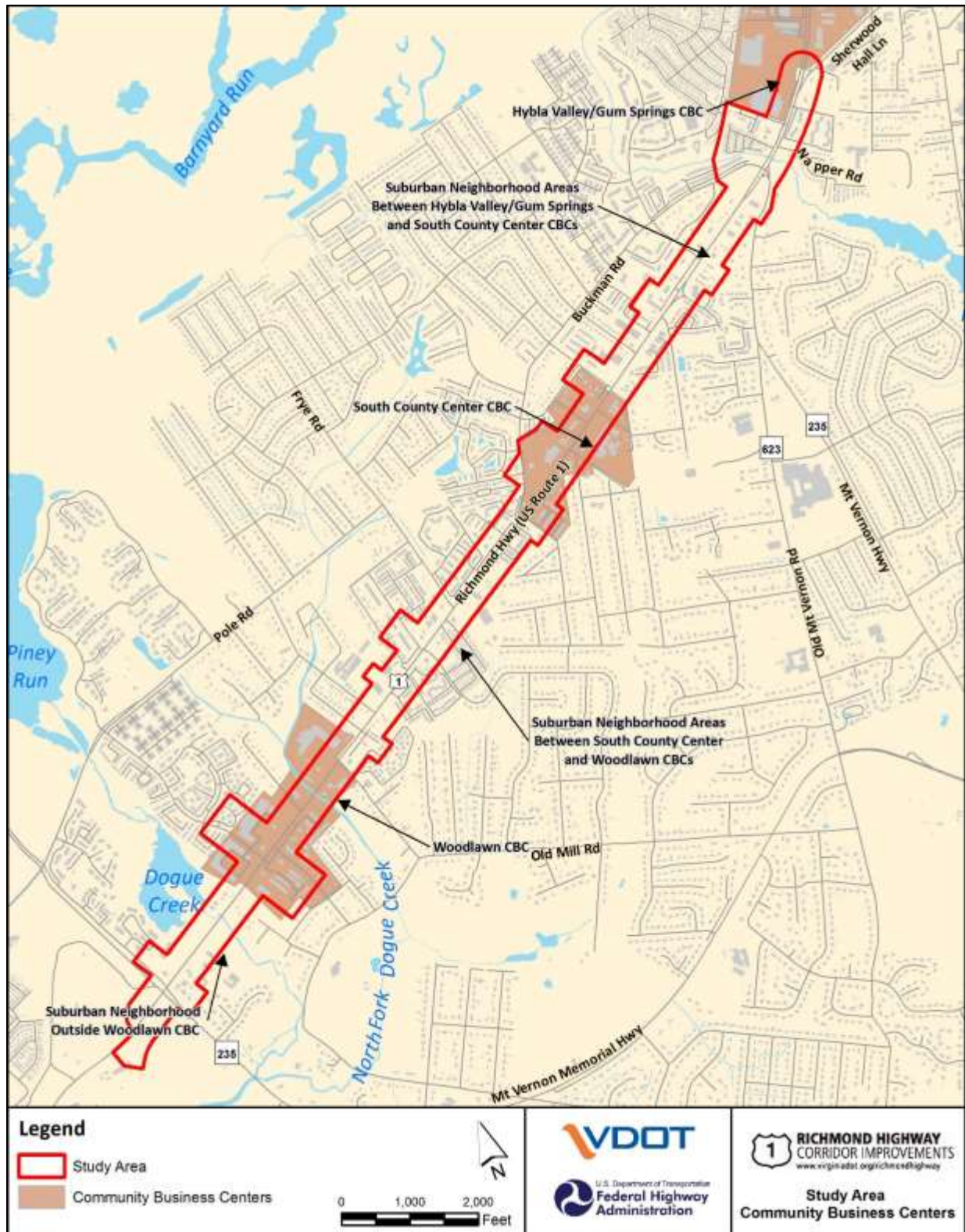
#### No-Build Alternative

The No-Build Alternative would not require right-of-way acquisitions; therefore, no associated direct impact on land use in the Study Area would occur.

#### Build Alternative

The Build Alternative would potentially require approximately 22 acres of permanent right-of-way to construct the proposed improvements. **Table 3-3** shows the approximate acres of land use per land use class proposed to be permanently converted to transportation use. The Build Alternative would meet

**Figure 3-1: Study Area Community Business Centers**





County transportation goals while widening on existing alignment, minimizing impacts to adjacent commercial and residential areas. Temporary right-of-way required for construction would be short-term and returned to the previous land use upon completion of the project.

**Table 3-3: Build Alternative Land Use Conversion to Transportation**

Land Use Category	Converted Acres
Commercial	11.1
Residential	3.7
Industrial	0.0
Institutional, Government, Utilities	2.2
Recreation and Open Space	5.0
<b>Total</b>	<b>22.0</b>

### 3.3 SOCIOECONOMIC RESOURCES

#### 3.3.1 Communities and Community Facilities

##### Existing Conditions

The Study Area is located within the Mount Vernon Planning District which is further subdivided into Planning Sectors. The Study Area spans five Planning Sectors which include: Mount Vernon, Woodlawn, Hybla Valley, Groveton, and Fort Hunt. For the purposes of this study, these Planning Sectors are considered “communities.” These communities were established during the early 19<sup>th</sup> century and have grown along Richmond Highway. The areas of the communities adjacent to Richmond Highway are primarily commercial, interspersed with higher density housing in the form of apartment buildings and townhomes, and fewer single-family residences.

Twenty-four community facilities are within the Study Area (**Table 3-4** and **Figure 3-2**). Of these, four are schools, one is a post office, four are parks, eight are religious institutions, five are community centers and / or non-profits, and two are government buildings. These facilities provide services to communities and neighborhoods in and around the Study Area.

**Table 3-4: Community Facilities**

Facility	Address / Community	Access	Transit Access
<b>Schools</b>			
Creative Learning School	8331 Washington Avenue / Mount Vernon	Access from Richmond Highway via driveways at Mohawk Lane and Washington Avenue	REX <sup>1</sup> and Route 171 bus routes provide direct access at Richmond Highway / Mohawk Lane (500 ft). Route 171 provides proximal access at Richmond Highway / Gregory Drive (600 ft)
Buckman Road KinderCare	4287 Buckman Road / Woodlawn	Access from Richmond Highway via driveway at Buckman Road	REX and Route 171 bus routes provide proximal access at Richmond Highway / Mohawk Lane (0.3 mi).



Facility	Address / Community	Access	Transit Access
Hopkins House-McNeil Preschool Academy	8543 Forest Place / Mount Vernon	Access from Richmond Highway via driveways off Forest Place	Route 171 bus route provides direct access at Richmond Highway and: Sky View Drive (500 ft), Forest Place (500 ft), and Frye Road (1,000 ft). Woodlawn Court, Cooper Road, Talbot Farm Drive, and Sacramento Drive. REX provides proximal access at Richmond Highway and Cooper Road and Sacramento Drive. Route 151 and Route 152 bus routes provide proximal access at Sacramento Drive and Richmond Highway.
Capital Kids Preschool and Learning Center	8758 Richmond Highway / Woodlawn	Access from Richmond Highway via driveway off Sacramento Drive	Route 151 and Route 152 bus routes provide direct access at Sacramento Drive / Richmond Highway (400 ft northwest). Route 171 provides direct access at Richmond Highway / Cooper Road (200 ft). REX provides direct access at Sacramento Drive / Richmond Highway (300 ft).
<b>Post Office</b>			
Engleside United States Post Office	8588 Richmond Highway / Woodlawn	Access from northbound and southbound Richmond Highway, via right-hand turn and left-hand turn lane at the intersection with Wyngate Manor Court	Route 171 bus route provides proximal access at Richmond Highway and: Highland Lane, Skyview Drive, and Forest Place (all approximately 600-700 ft).
<b>Parks and Recreation</b>			
Little Hunting Creek Park	Richmond Highway / George Washington Memorial Parkway / Fort Hunt & Mount Vernon	No access from Richmond Highway; no parking areas and access to the Park via Napper Road.	REX and Routes 171, 151, and 152 provide proximal access at Richmond Highway / Ladson Lane (700 ft)
Vernon Heights Park	8225 Central Avenue / Mount Vernon	No parking areas; access to park via trails off Shannons Green Way, Central Avenue, and Drews Court	Route 171 provides proximal access at Richmond Highway / Roxbury Drive (600 ft) and Richmond Highway / Shannons Green Way (1,000 ft). Route 151 / 152 provides proximal access at Mount Vernon Memorial Highway / Albee Lane (0.4 mi).

Facility	Address / Community	Access	Transit Access
Pole Road Park	5701 Pole Road / Woodlawn	No access from Richmond Highway. No parking areas; access to park via Woodlawn Green Drive and Shadwell Court (located in neighborhood off Jeff Todd Way)	Routes 171, 151, and 152 provide proximal access at Richmond Highway / Mount Vernon Memorial Highway (800 ft). Routes 151 and 152 provide proximal access at Pole Road / Sacramento Drive (0.25 mi).
Woodlawn Plantation	9000 Richmond Highway / Woodlawn & Mount Vernon	Driveway off Richmond Highway	Route 171 provides proximal access at Richmond Highway / Woodlawn Road (0.5 mi). Routes 101, 151, and 152 provide proximal access at Mount Vernon Memorial Highway / Richmond Highway (1 mi). REX, Route 171, and Route 151 provide proximal access at Richmond Highway / Old Mill Road (1 mi). REX, Route 171, and Route 152 bus routes provide proximal access at Richmond Highway / Mount Vernon Memorial Highway (1.1 mi).
<b>Religious Institutions</b>			
First AME Church	8653 Richmond Highway / Mount Vernon	Parking area adjacent to northbound Richmond Highway; no direct access from southbound Richmond Highway	REX and Route 171 bus routes provide proximal access at Richmond Highway / Lukens Lane (1,000 ft). Route 171 provides proximal access at Richmond Highway / Woodlawn Court (1,000 ft).
Spirit of Faith Ministries	8431 Richmond Highway / Mount Vernon	Parking area adjacent to northbound Richmond Highway; center turn lane for access from southbound Richmond Highway	REX and Route 171 bus routes provide proximal access at Richmond Highway / Frye Road (1,000 ft). Route 171 provides proximal access at Richmond Highway / Buckman Road (800 ft), Richmond Highway / Brevard Court (600 ft), and Richmond Highway / Graves Street (200 ft).
Evangelical Church Apostles	8401 Richmond Highway / Mount Vernon	Parking area with access from northbound and southbound Richmond Highway via signalized intersection at Buckman Road	Route 171 provides direct access at Richmond Highway / Buckman Road (100 ft) and Richmond Highway / Brevard Court (300 ft). Route 171 provides proximal access at Richmond Highway / Graves Street (0.2 mi).

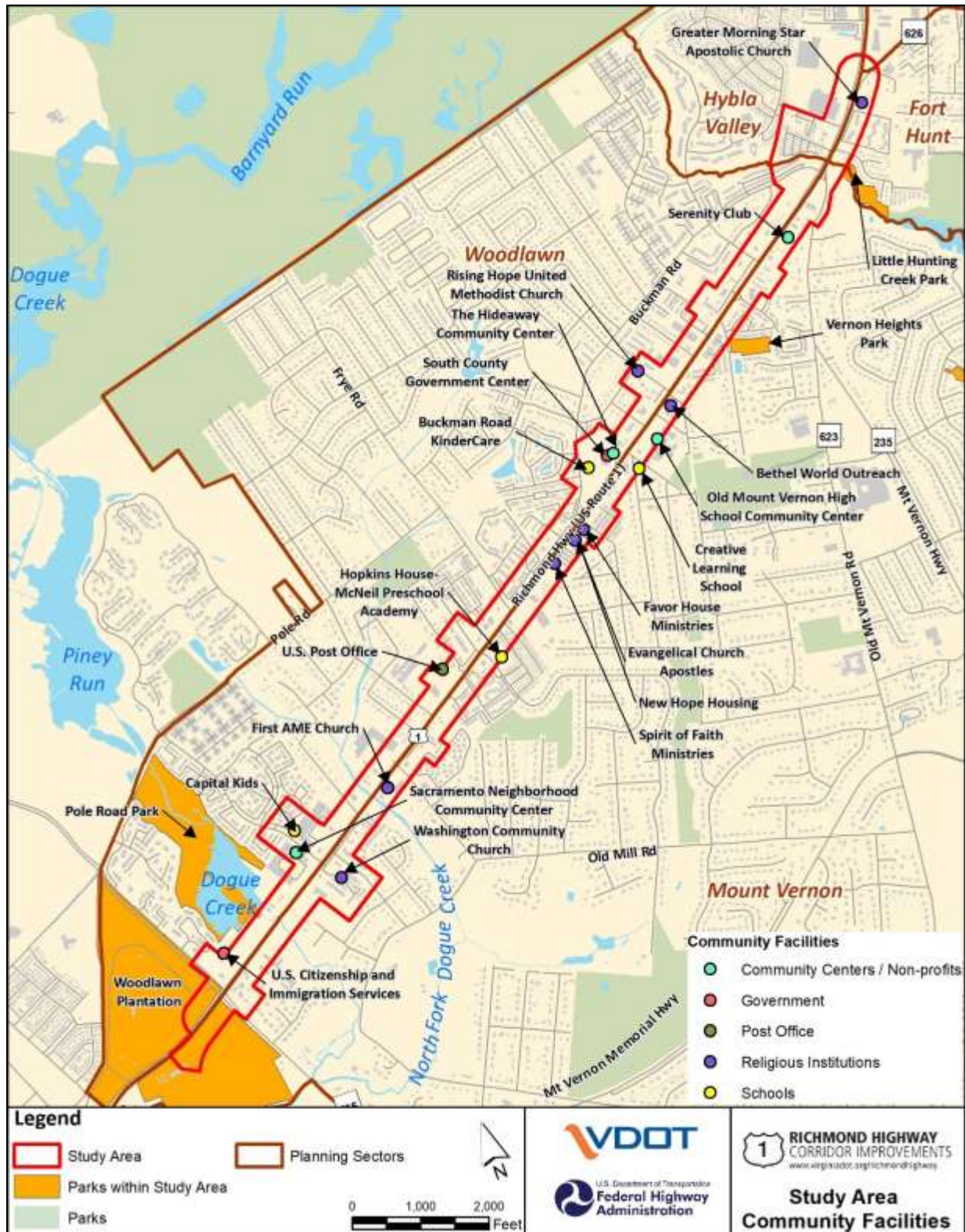
Facility	Address / Community	Access	Transit Access
Favor House Ministries	8400 Radford Avenue / Mount Vernon	Parking area with access from Radford Avenue or Richmond Highway via signalized intersection at Buckman Road	Route 171 provides direct access at Richmond Highway / Buckman Road (100 ft).
Rising Hope Mission Church	8220 Russell Rd / Woodlawn	Parking area on all three sides of the building with access from Russell Rd (additional parking at the Aldi's supermarket shopping center across the street)	Routes 151 and 152 provide proximal access at Buckman Road / Russell Road (1,000 ft). Route 171 provides proximal access at Russell Road / Richmond Highway (1,000 ft).
Bethel World Outreach Church	8305 Richmond Highway / Woodlawn	Parking area with access from Reddick Ave and Maury Pl	Route 171 provides proximal access at Richmond Highway / Russell Road (500 ft). Routes 151 and 152 provide proximal access at Buckman Road / Russell Road (0.4 mi).
Greater Morning Star Apostolic Church	7929 Richmond Highway / Fort Hunt	Parking area is directly adjacent to northbound Richmond Highway access from Northbound Richmond Highway. No direct access from Southbound Richmond Highway	Routes 151, 152, 161, 162, and 171 provide proximal access at Richmond Highway / Sherwood Hall Lane (1,000 ft). Routes 151, 152, 171 and REX provide proximal access at Richmond Highway / Ladson Lane (1,000 ft).
Washington Community Church	8800-C Pear Tree Village Court / Mount Vernon	Parking area with access from Richmond Highway / Pear Tree Village Ct and Cooper Road / Pear Tree Village Ct.	REX and Route 171 bus routes provide proximal access at Cooper Road / Richmond Highway (800 ft). REX and Routes 171, 151, and 152 provide proximal access at Sacramento Drive / Richmond Highway (1,000 ft).
<b>Government</b>			
South County Government Center / South County Health Center / Mount Vernon District Office Fairfax County Health Services	8350 Richmond Highway / Woodlawn	Access via Richmond Highway at Mohawk Lane intersection as well as access via driveway from Buckman Road	REX and Route 171 bus routes provide direct access at Richmond Highway / Mohawk Lane (200 f.). Route 171 bus route provides proximal access at Richmond Highway / Gregory Drive (500 ft).
United States Citizenship and Immigration Services –	8850 Richmond Highway Suite 100 / Woodlawn	Parking area with access via southbound Richmond Highway as well as access via Jeff Todd Way	REX, Route 171, and Route 151 provide direct access at Richmond Highway / Old Mill Road (500 ft). REX, Route 152, and Route 171 provide proximal access at

Facility	Address / Community	Access	Transit Access
Application Support Center			Richmond Highway / Mount Vernon Memorial Highway (500 ft). Route 101, Route 152, and Route 151 provide proximal access at Mount Vernon Memorial Highway / Richmond Highway (0.25 mi).
<b>Community Centers / Non-profits</b>			
Sacramento Neighborhood Community Center (non-profit)	8792 Sacramento Dr Suite E	Access off Richmond Highway at Sacramento Center as well as driveway via Sacramento Drive	REX and Route 171 bus routes provide direct access at Richmond Highway/ Sacramento Drive (285 ft).
Serenity Club Inc (non-profit AA)	8121 Richmond Highway / Woodlawn	Parking area with access via Route 1	Route 171 provides proximal access at Richmond Highway / Buckman Road (1100 ft) and Richmond Highway / Jama Lee Ave (800 ft).
New Hope Housing Inc.	8407 Richmond Highway E / Mount Vernon	Limited parking with access via Route 1	Route 171 provides proximal access at Richmond Highway / Graves Street (700 ft) and Richmond Highway / Brevard Ct (500 ft).
Old Mount Vernon High School Community Center	8333 Richmond Highway / Mount Vernon	Access from northbound and southbound Richmond Highway, via driveways off Maury Place, Mohawk Lane, Reddick Avenue, and small parking area adjacent to Richmond Highway northbound	Route 171 provides direct access at Richmond Highway / Gregory Drive (400 ft) and Richmond Highway / Mohawk Lane (800 ft). REX provides direct access at Richmond Highway / Mohawk Lane (800 ft).
Hideaway Teen Center	8350 Richmond Highway / Woodlawn	Access via Richmond Highway at Mohawk Lane intersection as well as via driveway from Buckman Road	REX and Route 171 bus routes provide direct access at Richmond Highway / Mohawk Lane (200 ft). Route 171 bus route provides proximal access at Richmond Highway and Gregory Drive (500 ft).

<sup>1</sup> Richmond Highway Express



**Figure 3-2: Community Facilities within the Study Area**





## **Environmental Consequences**

### *No-Build Alternative*

The No-Build Alternative would include routine maintenance and repairs of existing Richmond Highway in the Study Area that would have no direct physical impact on communities or community facilities. Therefore, in the absence of the Build Alternative improvements, increasing travel demand, congestion, and inadequate access control would increasingly hamper community mobility and connectivity and access to community facilities.

### *Build Alternative*

## **Communities**

The Build Alternative would improve access to adjacent communities by reducing congestion, improving safety, enhancing pedestrian and bicycle facilities, and providing space for future transit services along Richmond Highway in the Study Area. Continuous sidewalk and bicycle facilities would be provided along Richmond Highway in the Study Area along with adequately spaced, signalized crosswalks.

A total of 182 individual parcels are within the LOD of the Build Alternative. Of these, 39 are residential, 133 are commercial, and 10 are community facilities. The Build Alternative would potentially require displacing 17 housing units on six residential parcels, 46 businesses on 32 parcels, and two community facilities on two total acquisition parcels (**Table 3-5**). See the *Socioeconomics and Land Use Technical Report* (VDOT, 2017a) for detailed information on potential displacements. The LOD are the proposed boundaries within which all construction, access, material storage, grading, clearing, landscaping, noise walls and related activities would occur. The design for on-site stormwater management, including ponds and large facilities along the roadside and within intersections, was developed to a concept level of detail and is included within the LOD. Measures considered to avoid and minimize impact to the potentially affected properties include steepening roadside slopes and using guardrail, handrail, or retaining walls, moving surface stormwater management facilities, shifting proposed side street and entrance locations, and reducing amenity panel widths. Due to the transportation operational and safety needs, not all properties could be avoided.

Property acquisition and potential displacements would be conducted in accordance with all applicable federal laws, regulations and requirements, including but not limited to, 23 CFR § 710, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and its implementing regulations found in 49 CFR § 24. All persons displaced due to federally-assisted projects would be treated fairly, consistently, and equitably. Relocation resources would be available to all displaced residents and businesses without discrimination. The potentially affected properties are located along the edge of the communities adjacent to Richmond Highway, lessening potential impacts to community cohesion. Temporary construction easements are anticipated to have minimal community cohesion impacts from noise, dust, and visual impacts.

**Table 3-5: Build Alternative Total Parcel Acquisitions**

<b>Parcel Type</b>	<b>Total Parcels with Displacements</b>	<b>Displaced Housing Units / Buildings</b>
Residential	6	17
Commercial	32	46
Community Facility	2	2

The Build Alternative is located along an existing corridor and would not create a new physical barrier to inter-community interaction or cause adverse impacts to community connectivity or cohesion. Access control measures would be implemented including adequately spaced signalized intersections and left-turn lanes where needed. Comments received from agency coordination and public involvement included safety concerns from reducing access to side roads, and eliminating frontage roads that provide access to law enforcement and emergency response when traffic jams occur on the Richmond Highway mainline. Preliminary design was revised to provide signalized intersections and emergency access through the median where needed.

### **Community Facilities**

The Build Alternative would improve access to community facilities by reducing congestion, improving safety, and providing space for future BRT in the median along Richmond Highway in the Study Area, as called for in the DRPT Multimodal Study / Fairfax County Board of Supervisors Resolution. Short-term impacts to community facilities could include temporary road closures, changes to travel patterns, temporary reductions in parking, and traffic detours during construction.

Currently, of the 24 community facilities identified within the Study Area, two facilities would potentially be displaced, namely, First AME Church and Spirit of Faith Ministries in the Mount Vernon Community. Portions of right-of-way could be acquired from seven additional community facility parcels, with a majority of the impacts being slivers of land along the edge of the parcel and / or otherwise would not preclude access to or the primary use of these facilities. Avoidance and minimization measures as discussed under the Communities section above were considered for community facilities, but the transportation operational and safety needs of the project could not avoid all community facilities. Religious institutions' service times and funeral processions could be impacted during construction; however, these impacts would be temporary in nature and would cease upon completion of construction.

### **3.3.2 Bike Paths and Recreational Trails**

#### **Existing Conditions**

No bike lanes, shared use paths or cycle tracks as defined by Fairfax County are present in the Study Area along Richmond Highway (Fairfax County, 2014). However, bike routes as designated by Fairfax County (recommended routes for the safest cycling from point A to point B) exist within the Study Area on local streets and along Richmond Highway (**Figure 3-3**). Per the *Fairfax County Bicycle Master Plan (2014)*, bike lanes, shared-lanes, and cycle tracks are recommended throughout the Study Area.

#### **Environmental Consequences**

##### *No-Build Alternative*

As the No-Build Alternative would not result in improvements to Richmond Highway in the Study Area, no changes to bicycle facilities would result.

##### *Build Alternative*

The Build Alternative would benefit pedestrian and bicycle facilities in the Study Area by providing enhanced facilities to both sides of Richmond Highway and pedestrian underpasses at the Dogue Creek and Little Hunting Creek bridges. These improvements would increase transportation safety by separating pedestrian and bicycle traffic from the roadway travel lanes. Further, the Build Alternative improvements would provide more connections to the existing limited pedestrian and bicycle networks and planned future facilities in the Study Area and within Fairfax County. Short-term impacts to existing pedestrian

facilities and bike routes along Richmond Highway during construction could include detours and temporary closures.

The proposed underpasses at Dogue Creek and Little Hunting Creek would provide a one-stage crossing of the newly widened Richmond Highway for pedestrians. The underpasses would also connect to future recreational trails planned by Fairfax County. VDOT conducted an online survey in March and April of 2019 requesting whether respondents would use pedestrian underpasses at the Dogue Creek and Little Hunting Creek crossings, and if not, to please provide an explanation (see **Appendix B**). For Little Hunting Creek, 221 respondents indicated they would use the pedestrian underpass, while 5 said no and 125 provided explanations of why not. At Dogue Creek, 226 respondents said they would use a pedestrian underpass, 19 said no, and 113 people provided explanations. The primary reasons provided by respondents for not using either pedestrian underpass were security concerns related to personal safety, potential increased crime, vandalism, unsanitary conditions, encouraging camping, maintenance issues (snow removal, litter, flooding), expense, potential lack of use, and bicyclists would have to dismount to use them.

Fairfax County Department of Transportation has committed to providing 24-hour security, lighting, a call box, trash receptacles, and increased police patrols, along with ongoing maintenance. These measures would address many community concerns and mitigate the potential safety effects of the underpasses. Coordination with concerned organizations and county officials is ongoing and additional design changes to the proposed pedestrian underpasses may occur during advanced design. VDOT and Fairfax County Department of Transportation will ensure the community is heard, continuing ongoing outreach and providing additional meeting opportunities to discuss the potential underpasses with local residents.

### **3.3.3 Population Characteristics**

#### **Existing Conditions**

##### *Population*

According to 2010 US Decennial Census data, the population of the Census block groups in the Study Area is approximately 30,934 persons (2.9 percent of Fairfax County population and less than 1.0 percent of Virginia's population). **Figure 3-4** presents the Census block group boundaries and **Table 3-6** summarizes the study Census block group populations. Census block group 4215.00 BG 2 is the most populated (3,028 persons) and located in the northwest end of the Study Area adjacent to Richmond Highway. Census block group 4154.02 BG 3 has the lowest population (1,013 persons) within the Study Area and is located across Richmond Highway from the most populated census block in the northeast end of the Study Area.

##### *Housing*

Housing characteristics are summarized based on the American Community Survey (ACS) 2011-2015 five-year data at the Census block group level. A total of approximately 11,424 housing units are within the Study Area Census block groups and approximately 10,615 are occupied with the greatest number in Census block group 4160.00 BG 2 (1,225) in the Woodlawn community. Approximately 52 percent of the occupied housing units in the Study Area are owner-occupied and 48 percent are renter-occupied.

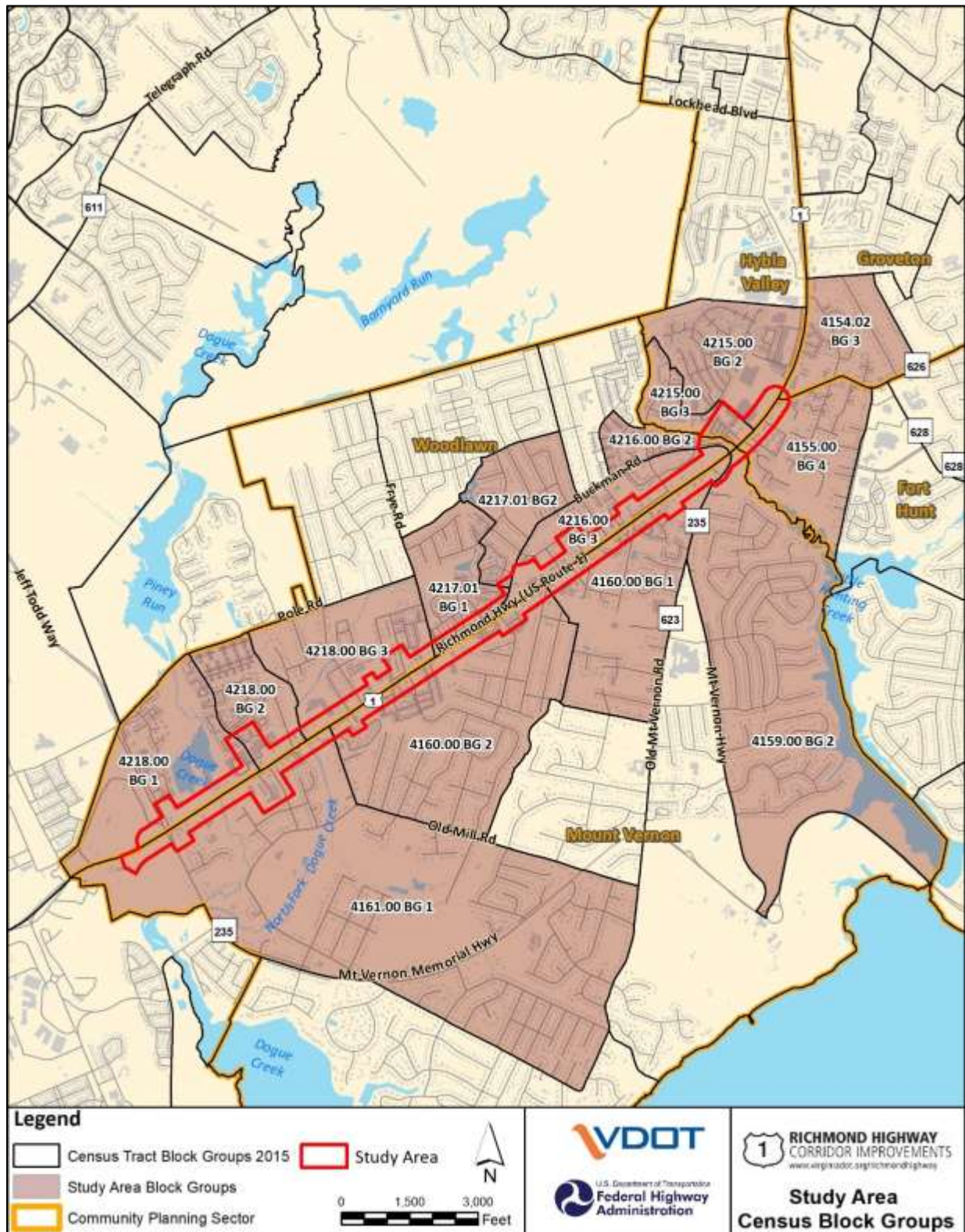


**Figure 3-3: Study Area Bike Routes**





**Figure 3-4: Study Area Census Block Groups**



### Environmental Consequences

#### *No-Build Alternative*

The No-Build Alternative would not result in project-related construction or any associated property acquisitions in the Study Area. Therefore, no impacts to population or housing would result from the No-Build Alternative.

#### *Build Alternative*

The Build Alternative would require additional right-of-way from residential properties for construction of the proposed improvements adjacent to the existing Richmond Highway right-of-way. Seventeen housing units from six residential parcels would be displaced under the Build Alternative. This equates to less than one percent of the total housing units in the study Census block groups. Per the ACS 2011-2015 five-year data, approximately 809 housing units are unoccupied in the study Census block groups. Displaced residents and the owners of property acquired for right-of-way would be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

**Table 3-6: Study Area Block Group Population**

Geographic Areas / Block Groups	Total Population	Community	Percent of Study Block Groups Total Population
<b>4154.02 BG 3</b>	1,013	Groveton	3.3%
<b>4155.00 BG 4</b>	1,459	Fort Hunt	4.7%
<b>4159.00 BG 2</b>	2,224	Mount Vernon	30.7%
<b>4160.00 BG 1</b>	1,679	Mount Vernon	
<b>4160.00 BG 2</b>	3,047	Mount Vernon	
<b>4161.00 BG 1</b>	2,535	Mount Vernon	
<b>4215.00 BG 2</b>	3,028	Hybla Valley	15.9%
<b>4215.00 BG 3</b>	1,884	Hybla Valley	
<b>4216.00 BG 2</b>	2,026	Woodlawn	45.5%
<b>4216.00 BG 3</b>	1,631	Woodlawn	
<b>4217.01 BG 1</b>	2,966	Woodlawn	
<b>4217.01 BG 2</b>	1,580	Woodlawn	
<b>4218.00 BG 1</b>	1,965	Woodlawn	
<b>4218.00 BG 2</b>	2,608	Woodlawn	
<b>4218.00 BG 3</b>	1,289	Woodlawn	
<b>Study Block Groups Total</b>	<b>30,934</b>	N / A	100% <sup>1</sup>
<b>Fairfax County</b>	<b>1,081,726</b>		
<b>Virginia</b>	<b>8,001,024</b>		

(US Census Bureau, 2010)

<sup>1</sup>due to rounding totals to 100.1%



### 3.3.4 Environmental Justice

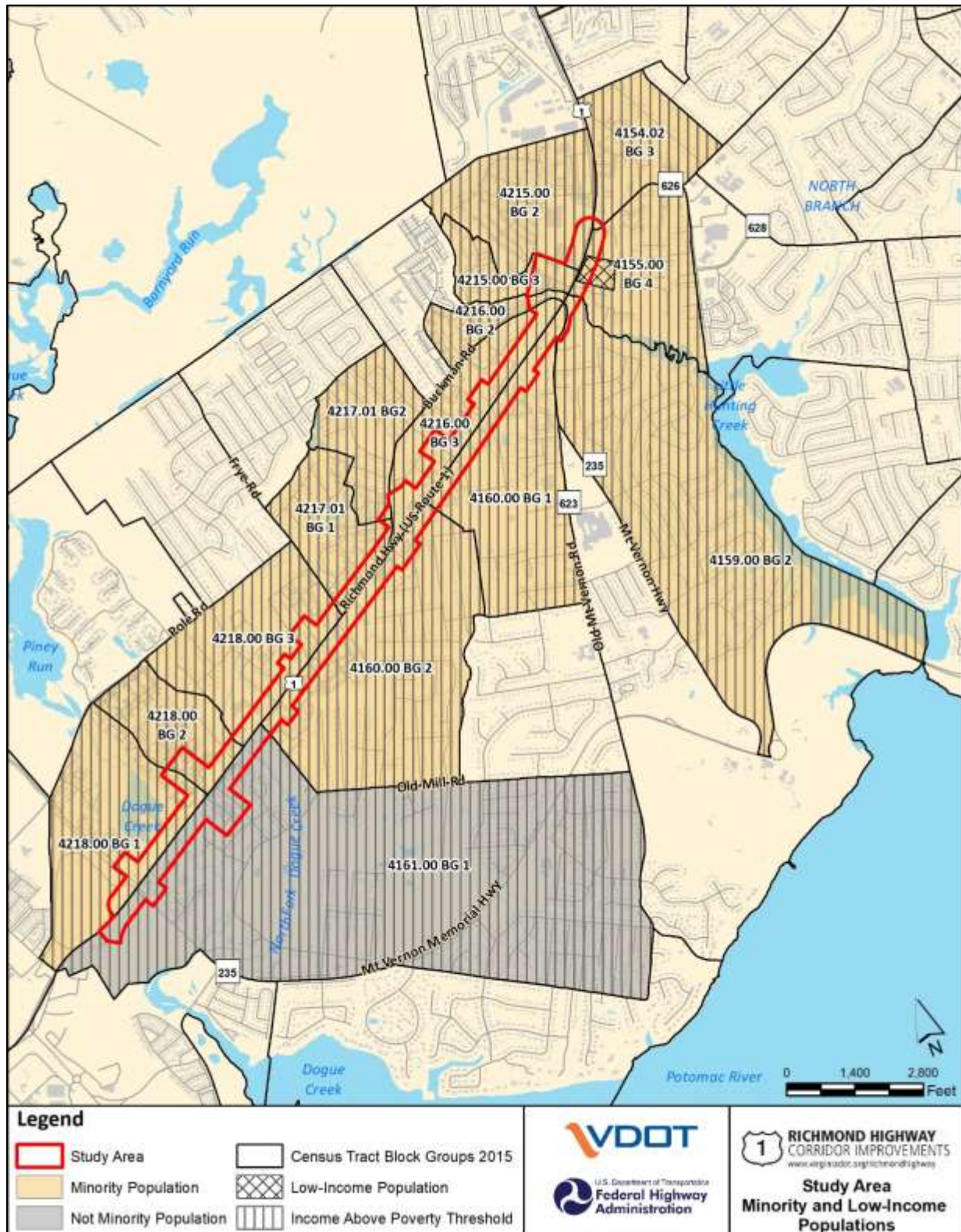
The USEPA defines Environmental Justice (EJ) as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” The EJ analysis has been prepared in accordance with the definitions, methodologies, and guidance provided in Executive Order 12898; CEQ’s *Environmental Justice Guidance Under the National Environmental Policy Act* (1997); US Department of Transportation (USDOT) Order 5610.2(a) *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012 revision); FHWA EJ Order 6640.23A: *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012); FHWA memorandum *Guidance on Environmental Justice and NEPA* (2011); and the FHWA *Environmental Justice Reference Guide* (2015).

#### Existing Conditions

##### *Minority Populations*

Data on minority populations is based on ACS 2011-2015 five-year data provided in detail in the *Richmond Highway Socioeconomics and Land Use Technical Report* (VDOT, 2017a). Executive Order 12898 and the USDOT / FHWA EJ Orders are concerned with identifying minority and low-income populations. Minority populations are defined as any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed / transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed USDOT / FHWA program, policy, or activity (USDOT and FHWA EJ Orders). For the purposes of this analysis, a minority population is present when: (a) the minority population of the affected area exceeds 50 percent of total population, or (b) the minority population percentage in the affected area is “meaningfully greater” than the minority population percentage in the general population or other appropriate unit of geographical analysis (CEQ, 1997). In this study, the minority population for a study Census block group will be found to be “meaningfully greater” than surrounding study block groups if its minority population is greater than the value of the block group with the lowest percentage of minority population within the study Census block groups, plus an additional 10 percent of that value. A total of 14 out of 15 study Census block groups meet the definition of a minority population (**Figure 3-5**). The only Census block group that does not meet the definition is 4161.00 block group 1.

**Figure 3-5: Study Census Block Group Minority and Low-Income Populations**



Based on the findings of the EJ population diversity in the project location, a more robust outreach was used to ensure the Spanish, and Korean speaking residents and business owners were informed. The Limited English Proficiency requirement was met by providing interpreters at the four Public Information Meetings and Design Public Hearing, providing translation of all meeting materials in English, Spanish and Korean. For the Harmony Place Trailer Park a special meeting was held at Good Shephard Catholic Church, in Alexandria, Virginia on February 6, 2020. This meeting presentation was in Spanish, with three interpreters fully engaged with the residents. Over the two-hour meeting, many residents provided comments in Spanish, and were able to communicate, allowing the project team a comprehensive opportunity to hear from this community. At other meetings, the project team was fully engaged with Korean business owners who also attended many meetings. VDOT has taken every opportunity to ensure the many communities in the study area have been acknowledged, and made efforts to have interpreters at every meeting.

#### *Low-Income Population*

*The Richmond Highway Socioeconomics and Land Use Technical Report* (VDOT, 2017a), includes information on low-income populations in the Study Area Census block groups. A low-income population is defined as any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed / transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed USDOT / FHWA program, policy, or activity (USDOT / FHWA EJ Orders). Using ACS 2011-2015 five-year data, low-income populations are identified where the median household income for a study Census block group is at or below the Health and Human Services (HHS) poverty threshold for a family of four (\$24,250). No study Census block groups have a median household income below the HHS poverty threshold, and therefore none are considered low-income populations. A federally-assisted affordable housing complex (Spring Garden Apartments) located in the northern Study Area at 7959 Richmond Highway is considered a low-income population.

### **Environmental Consequences**

#### *No-Build Alternative*

The No Build Alternative would not improve Richmond Highway and therefore would not result in any impacts to EJ populations.

#### *Build Alternative*

When impacts to EJ populations were identified, the impacts experienced by the affected population were compared to those experienced by others residing in the entire Build Alternative LOD. A disproportionately high and adverse effect on minority and low-income population locations is defined by the FHWA EJ Order as an impact that:

- Would be predominately borne by a minority and / or low-income population, or
- Would be suffered by the minority population and / or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the nonminority population and / or non-low-income population.

Per the FHWA *Memorandum Guidance on Environmental Justice and NEPA* (December 16, 2011), the impacts of the Build Alternative to minority and low-income populations were compared with respect to the impacts on the overall population within the Study Area (Census Block Groups that intersect with the Build Alternative). The benefits of reduced congestion, improved mobility, and enhanced pedestrian and

bicycle facilities under the Build Alternative would be borne by all who reside along or use the Richmond Highway corridor, including minority and low-income populations.

Under the Build Alternative conceptual design, improvements are proposed to either side of an existing facility, that at the planning level, would not disproportionately impact either side. Sixteen housing units on five residential parcels could be displaced in Census block groups containing minority populations, and one housing unit from one residential parcel could be displaced in a non-EJ area. Although housing displacements could occur on five parcels within Census block groups containing minority populations, the non-minority resident population within those same block groups ranges from 15.9 to 84.1 percent. This increases the probability that not all residential displacements would be borne by minorities and the impact would not be disproportionate and adverse. No residential displacements would occur at the Spring Garden Apartments, the only low-income population in the study area. Potential temporary right-of-way impacts during construction are not considered disproportionate or adverse to minority or low-income populations within the Study Area, as use would be short term and the land would be returned in condition similar to its original use. The minority or low-income status of any resident that may be displaced would be determined in the right-of-way acquisition phase of the project. Should any relocations of minority or low-income persons occur, relocations would be completed in accordance with the Uniform Relocation and Real Property Acquisition Act (1970).

All parcels would retain at least one access without impacting use of the parcel; thus, access changes are not anticipated to be disproportionate and adverse to minority or low-income populations residing in the Study Area. The Build Alternative would cause noise impacts to both EJ populations and other residents; therefore, consideration for mitigation would be provided without discrimination when warranted and determined to be feasible and reasonable.

At Dogue Creek, the Census block group 4218.00 BG1 to the west of the bridge is a minority population, whereas Census block group 4161.00 BG1 to the east is neither a minority nor low-income population. The Little Hunting Creek Bridge is surrounded by Census block groups that qualify as minority populations. Residents at the Harmony Place Trailer Park expressed concerns and the New Gum Springs Civic Association, representing residents living near the Little Hunting Creek Bridge, does not support providing a pedestrian underpass. The Mount Vernon Council of Citizens' Association, representing residents throughout the Study Area, also expressed concerns with the underpasses proposed at Dogue Creek and Little Hunting Creek. Concerns expressed about both underpasses include providing easier access to nearby residential areas that could increase crime, more difficulty in monitoring areas below the bridge that could decrease safety, increased litter, vandalism, maintenance issues, enabling camping, unsanitary conditions, and flooding. Measures to provide 24-hour security such as cameras were requested. Fairfax County has committed to 24-hour security, lighting, and increased police patrols, along with ongoing maintenance of the underpasses.

Providing pedestrian underpasses as proposed by the Build Alternative would not result in any residential or other relocations, thereby minimizing impacts to minority populations. The proposed underpasses would provide alternative below grade access for those residential communities, so pedestrians could cross under the roadway, rather than having to stop at the at-grade signalized intersection. Measures included in the Build Alternative to address concerns and mitigate potential safety effects include providing lighting, a call box, and trash receptacles at each underpass.

Coordination with concerned organizations and county officials is ongoing and additional design changes to the proposed pedestrian underpasses may occur during advanced design. VDOT and Fairfax County Department of Transportation will ensure the community is heard, continuing ongoing outreach and



providing additional meeting opportunities to discuss the potential underpasses with local residents. VDOT and Fairfax County will work with the communities to determine the timing of additional meetings, and create a joint information sharing opportunity. Any associated changes in effects to Environmental Justice populations would be assessed in a NEPA Reevaluation. The safety measures implemented by Fairfax County Department of Transportation such as 24-hour security, lighting, a call box, trash receptacles, and increased police patrols, along with ongoing maintenance, address the community concerns and mitigate the potential safety effects of the underpasses. The underpasses are not anticipated to have a disproportionate high and adverse effect on minority or low income populations.

Potential direct, indirect and cumulative impacts of the project to minority and low-income populations in the study area have been evaluated in the project's *Socioeconomics and Land Use Technical Report* and the *Indirect and Cumulative Impacts Technical Report*.

### **3.3.5 Economics**

#### **Existing Conditions**

##### *Income*

The income data is based on the ACS 5-year 2011-2015 median household income data of persons residing in the study Census block groups. Census block group 4215.00 BG 3 located in Hybla Valley had the lowest median household income (\$25,957) and block group 4159.00 BG 2 located in Mount Vernon had the highest median household income (\$154,408). The median household income of all the study Census block groups is \$67,163, which is less than that of Fairfax County (\$112,552), but greater than that of Virginia (\$65,015).

##### *Employment*

Per the ACS five-year 2011-2015 labor force and employment data, approximately 93.1 percent of the work force in the study Census block groups is employed. This is less than the Fairfax County (95.2 percent) employment rate and similar to the statewide rate (93.7 percent). Most civilian workers residing in the study Census tracts are engaged in professional, scientific, management, administrative, and waste management (17.7 percent); and educational services, health care, and social assistance (16.6 percent) industry sectors. In comparison, the same categories account for 24.8 percent and 17.7 percent of respective employed residents in Fairfax County, and 14.7 percent and 21.8 percent in Virginia.

##### *Business*

The US Census Bureau's Business Patterns 2014 data (US Census Bureau, 2016a and 2016b) provides certain business characteristics by North American Industry Classification System (NAICS) code and zip code. There are 519 business establishments in zip code 22306 and 390 in zip code 22309. The top five establishment sectors in the Study Area zip codes are: retail trade; health care and social assistance; other services; professional, scientific, and technical services; and accommodation and food services. The most establishments in Fairfax County and statewide are in the professional, scientific, and technical services sector.

#### **Environmental Consequences**

##### *No-Build Alternative*

The No-Build Alternative would not make any improvements to Richmond Highway in the Study Area, and thus no direct impact to income, employment, or economics would occur.

### *Build Alternative*

The Build Alternative would require displacing 46 businesses on 32 parcels that comprise approximately five percent of establishments within the zip codes encompassing the Study Area. The number of commercial displacements may possibly be reduced in the advanced design process. Displaced businesses would be compensated under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and would be eligible for relocation assistance. Commercial displacements under the Build Alternative would not substantially impact median household income or resident employment in the study Census block groups, even assuming all displaced businesses would relocate out of the Study Area. This is because the total number of displaced businesses would be a small proportion of the total number of establishments (approximately five percent) in the study zip codes. Also, given that most businesses in the study zip codes have less than five employees, it is likely most of the displaced businesses would be relatively small, with little impact on median household income or employment in the study Census block groups. Temporary job increases associated with construction of the Build Alternative may occur in the Study Area. The extent and duration of such temporary job increases would be proportional to the construction cost of the Build Alternative.

## **3.4 NATURAL RESOURCES**

### **3.4.1 Water Resources**

#### **Existing Conditions**

##### *Water Quality*

Section 305(b) of the Clean Water Act (CWA) requires each state to submit a report to the USEPA every two years describing the status of its surface and ground waters. Under Section 303(d) of the CWA, states are required to develop a list of impaired waters. Three perennial streams are within the Study Area: Little Hunting Creek, North Fork Dogue Creek and Dogue Creek. Of these, Little Hunting Creek and Dogue Creek are designated “impaired waters” under Section 303(d) of the CWA (Virginia Department of Environmental Quality [VDEQ], 2014). Causes of impairment to these two streams include the presence of polychlorinated biphenyls (PCBs) in the water column (Little Huntington Creek) and *E. coli* (Dogue Creek). **Table 3-7** provides the source of impairment, impaired use, and stream length within the Study Area.



**Table 3-7: Study Area Impaired Waterbodies**

ID	Waters Name	Impairment Reach	Impairment Cause (Impaired Use)	Impairment Source	Impairment Length within Study Area (Feet)
VAN-A14R_LIF01A08	Little Hunting Creek	Segment begins at the confluence with an unnamed tributary, approximately 0.82 river miles upstream from the Route 1 bridge, and continues downstream until tidal waters	PCBs in Water Column (Fish Consumption)	Atmospheric Deposition – Toxics, Combined Sewer Overflows, Contaminated Sediments, Upstream Source	1,174.0
VAN-A14R_DOU01A04	Dogue Creek	Segment begins at the confluence with an unnamed tributary to Dogue Creek, approximately 0.3 river miles upstream from Rt. 622, and continues downstream until the end of the free-flowing waters of Dogue Creek	<i>E. coli</i> (Recreation)	Source Unknown	634.3

County-designated Environmental Quality Corridors (EQC) are an open space system designed to link and preserve natural resource areas and provide passive recreation. The system includes stream valleys, wildlife habitats, and wetlands. As dictated by the County Comprehensive Plan 2017 edition Environment, as amended (3-14-2017), impacts of development on EQCs is generally prohibited except when disturbances serve a public purpose such as unavoidable public infrastructure easements and rights-of-way. Further, the Plan states stormwater management facilities should not be located in EQCs except under special conditions. EQCs in the Study Area include along Dogue Creek, North Fork Dogue Creek and Little Hunting Creek.

#### *Streams*

Non-tidal streams were identified within the Study Area using the National Hydrography Dataset (NHD) from the US Geological Survey (USGS, 2016a) and field reconnaissance of the Study Area.

The Study Area is contained in two 12-digit Hydrologic Unit Code (HUC) subwatersheds (Virginia Department of Conservation and Recreation [VDCR], 2015). The eastern portion of the Study Area is in the Potomac River – Little Hunting Creek subwatershed (HUC 020700100307) and the western portion of the Study Area is in the Dogue Creek subwatershed (HUC 020700100306). **Table 3-8** summarizes the linear feet of streams in the Study Area by Cowardin classification (Cowardin et al., 1979). All waters ultimately flow to the Potomac River. All of the creeks in the Study Area are within Fairfax County-designated EQCs.

**Table 3-8: Streams within Study Area**

Cowardin Abbreviation	Waters Name	Cowardin Classification	Acreage / Linear Feet within Study Area
R3	Little Hunting Creek, North Fork Dogue Creek and Dogue Creek	Upper Perennial	1.4 / 2,836.3
R6	Unnamed tributaries to Little Hunting Creek, North Fork Dogue Creek and Dogue Creek	Ephemeral	<0.01 / 132.2
<b>Total</b>			<b>1.4 / 2,968.5</b>

#### *Wetlands*

Executive Order 11990, Protection of Wetlands, established a national policy and mandates that each federal agency acts to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural value. A field delineation of Waters of the US (WOUS) and wetlands was performed according to the methodology outlined in the US Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE, 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE, 2010).

A total of approximately 1.2 acres of wetlands are within the Study Area that **Table 3-9** presents by Cowardin et al. (1979) classification. All delineated wetlands are within the Dogue Creek, North Fork Dogue Creek and Little Hunting Creek EQCs designated by Fairfax County.

**Table 3-9: Wetlands within Study Area**

Cowardin Abbreviation	Cowardin Classification	Acreage within Study Area
PEM	Palustrine, Emergent	0.3
PFO	Palustrine, Forested	0.8
POW	Palustrine, Open Water	0.1
<b>Total</b>		<b>1.2</b>

#### *Aquifers / Water Supply*

The Virginia Department of Health (VDH) reviews projects for their proximity to public drinking water sources. The USEPA's National Sole Source Aquifer (SSA) Geographic Information System (GIS) Layer was used to determine the boundaries of SSAs. Information on groundwater and underlying aquifers was obtained with assistance from VDEQ's Ground Water Withdrawal Permitting Program, Office of Water Supply. No public water resources were found in the Study Area, but the Study Area is within the Eastern Groundwater Management Area in Virginia. Under the Ground Water Management Act of 1992, Virginia manages groundwater through a program regulating the withdrawals of groundwater within designated Groundwater Management Areas (GWMA). Any person or entity located within a declared GWMA must obtain a permit to withdraw 300,000 gallons or more of groundwater in any one month.

### **Environmental Consequences**

#### *No-Build Alternative*

The No-Build Alternative would not result in changes to water quality, streams, wetlands, or aquifers / water supply.

#### *Build Alternative*

### **Water Quality**

The Build Alternative would disturb up to 79.6 acres of land. Construction of the Build Alternative would address compliance using the Virginia Runoff Reduction Method (VRRM), a stormwater compliance framework focused not only on water quality treatment, but also on reducing the overall runoff volume to better replicate pre-development hydrologic conditions. The proposed new stormwater management facilities would help to mitigate these potential effects to water quality by addressing stormwater quality and quantity, and possibly improving water quality over existing conditions. The specific number and location of stormwater management facilities would be determined in advanced design. Stormwater management facilities are generally prohibited from location in EQCs such as Dogue Creek, North Fork Dogue Creek and Little Hunting Creek.

### **Streams**

The Build Alternative would impact up to 0.67 acre or 963.1 linear feet at the existing crossings of three Upper Perennial (R3) streams: Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek. The exact minimization and compensatory mitigation measures for direct stream impacts would be developed in permitting and final design in consultation with federal, state and local regulatory agencies, including Fairfax County.

### **Wetlands**

Under the Build Alternative, a total of 0.2 acre of long-term wetland impacts would occur from converting wetlands into upland, losing all wetland functions. A palustrine emergent wetland associated with North Fork Dogue Creek would have a direct impact of 0.1 acre, and a palustrine forested wetland near the crossing of Dogue Creek would have an impact of 0.1 acre. Potential short-term direct impacts of construction to wetlands could include construction of temporary accesses for equipment, temporary removal of wetland vegetation and disturbed wetland bottom. The exact mitigation for both long- and short-term impacts to wetlands would be developed in consultation with regulatory agencies, including Fairfax County, during permitting. Implementation of strict erosion and sediment control measures during construction would reduce temporary impacts to wetlands and thereby EQCs. Restricting the location of temporary staging areas and stormwater management facilities out of wetlands and EQCs would reduce direct impacts.

### **Aquifers / Water Supply**

The Build Alternative would not involve any effects from construction because there are no public groundwater wells, surface water intakes, springs, SSA, or reservoirs in the Study Area and roadway cuts are not anticipated to encounter the aquifer.

### 3.4.2 Wildlife

#### **Existing Conditions**

##### *Terrestrial Wildlife / Habitat*

Information was collected from database queries from the US Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC), the Virginia Department of Game and Inland Fisheries (VDGIF) Fish and Wildlife Information Service (VAFWIS), and the Virginia Department of Conservation and Recreation – Department of Natural Heritage (VDCR-DNH).

Information on land use was gathered from local comprehensive and land use plans, aerial photos, input from local and regional planning officials, and field reconnaissance.

Expanses of terrestrial habitat in the Study Area are rare and fragmented as residential, commercial, industrial, and government / military areas are common, resulting in low quality edge habitat. There are three wildlife corridors that coincide with Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek within the Study Area used by a variety of wildlife species. However, the existing Richmond Highway fragments these corridors at the stream crossings. The wildlife species most capable of adapting to habitat fragmentation due to dense urban and suburban development include but are not limited to rabbits, whitetail deer, eastern gray squirrels, red fox, raccoon, striped skunk, and many common non-migratory bird species (VDGIF, 2015).

##### *Anadromous Fish*

The VDGIF administers Anadromous Fish Use Areas under the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) while the National Oceanic and Atmospheric Administration (NOAA) Fisheries has jurisdiction over anadromous fish listed under the Endangered Species Act through their Office of Protected Resources. The presence of both confirmed and potential Anadromous Fish Use Areas was obtained using VDOT's Comprehensive Environmental Data and Reporting System (CEDAR) GIS Database that contains VDGIF's anadromous fish information from the VAFWIS database (VDOT, 2016b). Dogue Creek and the Potomac River are confirmed Anadromous Fish Use streams and Little Hunting Creek is a potential Anadromous Fish Use stream. Although these streams are within the vicinity (2-mile radius) of the Study Area, the Anadromous Fish Confirmed Use Areas and potential use areas do not extend upstream into the Study Area. Potential indirect and cumulative impacts to anadromous fish are presented in Section 3.9.

#### **Environmental Consequences**

##### *No-Build Alternative*

The No-Build Alternative would not involve any project-related construction to Richmond Highway in the Study Area or changes to the natural environment other than those from continued maintenance of the roadway. As a result, project-related environmental effects to wildlife and terrestrial habitat from the No-Build Alternative are not anticipated. No direct impacts to Anadromous Fish Use Areas would occur. Potential downstream effects to anadromous fish under the No-Build Alternative are addressed in the *Indirect and Cumulative Effects Technical Report* (VDOT, 2017g).

##### *Build Alternative*

##### **Terrestrial Wildlife / Habitat**

Under the Build Alternative, Richmond Highway in the Study Area would continue to pose a barrier to wildlife movement. Incrementally increasing the width of the roadway would not likely substantially

exacerbate existing conditions. Potential for temporary impacts to wildlife exist with the removal of vegetated cover within the construction footprint and construction noise, likely causing animal migration away from the disturbance and a temporary reduction in habitat usage by mostly common edge-dwelling species. Measures to minimize impacts to habitat connectivity and wildlife passage would be evaluated by VDOT in consultation with federal, state and local wildlife officials while developing mitigation commitments as part of permitting.

To reduce potential impacts to adjacent terrestrial habitats, construction practices would avoid the removal of existing vegetation to the greatest extent practicable and would include the implementation and maintenance of strict erosion and sediment control measures and stormwater management best management practices.

Pollinator species could include honey bees, native birds, bats, and butterflies. The study area is in a densely populated urban area that has been previously disturbed; therefore, the area does not currently support much pollinator habitat. These pollinator species could be considered in the development of the seed mix. The VDOT Pollinator Habitat Program is in development and currently focuses on rest areas and park and rides along state-maintained roadways.

### **Anadromous Fish**

No Anadromous Fish Use Areas are within the Study Area or the LOD; therefore, no direct impacts to these areas would occur under the Build Alternative. Direct impacts could include fish mortality from in-stream construction. VDOT would include bridge design and BMPs that reduce direct impacts to anadromous fish and other aquatic wildlife during construction at Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek, such as time of year restrictions. Anadromous Fish Use Areas are within the vicinity (2-mile radius) of the Study Area, and anadromous fish species have been observed upstream of the Richmond Highway stream crossings in the Study Area. Potential indirect effects of the Build Alternative to Anadromous Fish Use Areas are evaluated in detail in the *Indirect and Cumulative Effects Technical Report (VDOT, 2017g)* and summarized in **Section 3.9** of this EA.

### **3.4.3 Threatened and Endangered Species**

The federal Endangered Species Act of 1973 and subsequent amendments and regulations define basic protections for federally-listed wildlife and plants that are considered threatened, endangered, or species of greatest conservation need. The law also affords protection to prescriptive habitat critical for protected species' survival, and applies to all federal, state, and privately-authorized projects or actions. The USFWS and the NOAA National Marine Fisheries Service (NMFS) are responsible for listing, protecting, and managing federally-listed threatened and endangered species.

The Virginia Endangered Species Act of 1972 and the Endangered Plant and Insect Species Act of 1979 protect the species that are listed as threatened or endangered in the state. The VDGI and the Virginia Department of Agriculture and Consumer Services (VDACS) are responsible for administering and enforcing the state endangered species regulations. In addition, a cooperative agreement with the USFWS, signed in 1976, recognizes VDGI as the designated state agency with regulatory and management authority over federally-listed animals and provides for federal / state cooperation regarding the protection and management of those species. VDACS holds authority to enforce regulations pertaining to plants and insects.



### Existing Conditions

The information obtained from the agency database review conducted for this project is summarized below in **Table 3-10**. The USFWS IPaC (USFWS, 2011) was searched for species within the Study Area boundaries. The VDGIF VAFWIS data search (VDGIF, 2016a) was conducted within a 2-mile radius of the center of the Study Area. **Table 3-10** presents the species that are currently listed as threatened or endangered that are known to occur, or have the potential to occur, in the vicinity of the Study Area along with each species' listed status and source of its listing.

**Table 3-10: Threatened or Endangered Species Mapped within the Vicinity of the Study Area**

Species	Status	Source of Listing
Atlantic Sturgeon ( <i>Acipenser oxyrinchus</i> )	Federally Endangered	VaFWIS
Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	Federally Threatened	IPaC
Little Brown Bat ( <i>Myotis lucifigus lucifigus</i> )	State Endangered	VaFWIS
Tri-colored Bat ( <i>Perimyotis subflavus</i> )	State Endangered	VaFWIS
Wood Turtle ( <i>Glyptemys insculpta</i> )	State Threatened	VaFWIS
Peregrine Falcon ( <i>Falco peregrinus</i> )	State Threatened	VaFWIS

### Environmental Consequences

#### *No-Build Alternative*

The No-Build Alternative would not involve any construction or changes to the natural environment. Thus, environmental effects to threatened or endangered species from the No-Build Alternative are not anticipated.

#### *Build Alternative*

No species or habitat surveys were completed in the Study Area during preparation of the EA to confirm the presence, or indicate the absence of, those species listed in **Table 3-10**. Due to the potential presence of listed species in the Study Area, close regulatory coordination would be required during the permitting process for the Build Alternative. At that time, the agencies may require surveys be completed to confirm the presence, or absence of, listed species in the Study Area. If required, these surveys must be conducted by an approved surveyor, and often are only acceptable if completed during certain periods of the year. If presence of a listed species is confirmed, the agencies may recommend a time-of-year restriction for activities within occupied habitat and these restrictions would be determined as part of the permitting process. A summary of current, applicable VDGIF time-of-year restrictions (VDGIF, 2016b) for the protected species with the potential to occupy the Study Area is provided in **Table 3-11**. Use of these time-of-year restrictions would offset potential direct impacts, would mitigate indirect effects outside of the area of direct impact, and should result in a "not likely to adversely affect" determination from the resource agencies. If impacts cannot be avoided, Endangered Species Act Section 7 coordination may be required.

In accordance with a memorandum of understanding between VDOT and FHWA, the results of presence/absence surveys would not influence the NEPA / location decision process. Therefore, if surveys were required from the resource agencies, the coordination requiring the surveys would occur during the permitting/design stage of the study. Following, or as part of, the coordination, VDOT would complete the surveys required by the natural resource agencies.

**Table 3-11: Protected Species Time of Year Restrictions**

Species	Time of Year Restrictions
Wood Turtle	For instream work: 01 October – 31 March; For work within 900 feet of stream (zone of concern): 01 April – 30 September. Maintain undisturbed naturally vegetated buffer of at least 300 feet on stream.
Peregrine Falcon	15 February – 15 July for activities within 600 feet of nest.
Northern Long-eared Bat	15 April – 15 September for tree removal activities. Prohibit tree removal within 150 feet of a documented maternity roost and prohibit tree removal within 0.25 miles of a documented hibernaculum from 1 June through 31 July
Little Brown Bat and / or Tri-colored Bat	0.25 miles of a “major” hibernaculum within 150 feet of a known roost tree
Bald Eagle Concentration Area	Yearly periods extending 15 May – 31 August and 15 December – 15 March

Source: VDGIF, 2016b.

In addition to potentially timing construction activities to avoid impacts to threatened or endangered species, potential impacts to listed species may be reduced further through efforts to minimize the construction footprint of the project. Mitigation measures may also include contractor training in recognizing and avoiding threatened or endangered species and their habitats, and restoration of habitat. Construction practices would avoid the removal of existing vegetation to the greatest extent possible and include the implementation of best management practices for erosion and sediment control as well as stormwater management to reduce potential impacts to adjacent habitats and properties. Practices such as use of silt fence and straw bales, diversion ditches, sediment traps and basins, culvert outlet protection, vegetative streambank stabilization, dewatering structures, temporary and permanent seeding, and flagging or fencing of areas not to be disturbed would minimize impacts to both protected terrestrial and aquatic species.

#### 3.4.4 Floodplains

Several federal directives regulate construction in floodplains to ensure that consideration is given to avoidance and mitigation of adverse effects to floodplains. These federal directives include the National Flood Insurance Act of 1968, Executive Order 11988, and USDOT Order 5650.2 titled “Floodplain Management and Protection”. The National Flood Insurance Act of 1968 established the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA). In Virginia, the VDCR is responsible for coordination of all state floodplain programs. Development within floodplains is also regulated by local flood insurance programs administered by localities under the NFIP.

To reduce the risk of flood loss and to minimize the impact of floods on human safety, while preserving the natural beneficial values of floodplains, Executive Order 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with construction within and modification of floodplains. The order also requires agencies to avoid direct and indirect support of floodplain development wherever there is a practical alternative. Executive Order

13690, *Establishing a Federal Flood Risk Management Standard (FFRMS) and a Process for Further Soliciting and Considering Stakeholder Input*, amends Executive Order 11988 by requiring federal agencies to use natural systems, ecosystem process, and nature-based approaches to identify alternatives and require federal agency regulations or procedures to be consistent with the FFRMS. USDOT Order 5650.2 guides the USDOT's implementation of Executive Order 11988 and requires the detailed consideration of impacts to floodplains, as well as avoidance and minimization.

In support of USDOT Order 5650.2, regulations promulgated at 23 CFR § 650 state that it is the policy of the FHWA, among other things, to avoid significant encroachments of the floodplain, where practicable. A significant encroachment is defined as:

A highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction- or flood-related impacts:

- (1) A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
- (2) A significant risk, or
- (3) A significant adverse impact on natural and beneficial floodplain values.

The VDCR floodplain management program and VDOT construction specifications for roadways also address roadway construction within floodplains. Sections 107 and 303 of VDOT's specifications require the use of stormwater management practices to address issues such as post-development storm flows and downstream channel capacity. These standards require that stormwater management be designed to reduce stormwater flows to preconstruction conditions for up to a 10-year storm event. As part of these regulations, the capture and treatment of the first half inch of run-off in a storm event is required, and all stormwater management facilities must be maintained in perpetuity.

### **Existing Conditions**

Approximately 24 acres of FEMA mapped 100-year floodplains are within the Study Area. The 100-year floodplain includes those areas that statistically have a one percent chance of being flooded in any given year. The 100-year floodplains occurring within the Study Area are associated with Dogue Creek, the North Fork Dogue Creek, and Little Hunting Creek (**Figure 3-6**).

### **Environmental Consequences**

#### *No-Build Alternative*

No project-related construction or changes to the natural environment other than those from continued maintenance of Richmond Highway would occur in the Study Area under the No-Build Alternative. Thus, project-related environmental effects to FEMA floodplains or their natural and beneficial floodplain values are not anticipated.

#### *Build Alternative*

The Build Alternative would encroach upon approximately 8.9 acres of regulated floodplains (**Table 3-12**). Individual impacts to any one floodplain would be relatively small in size and severity as most floodplain encroachments from the Build Alternative would be from the perpendicular crossing of floodplains, not from longitudinal encroachments. Perpendicular crossings would result in less floodplain fill, maximizing floodwater conveyance and storage compared to longitudinal encroachments.

**Table 3-12: FEMA 100-Year Floodplains within the LOD (Acres)**

<b>Waterway</b>	<b>Acre(s) within LOD<sup>1</sup></b>
Dogue Creek	5.7
North Fork Dogue Creek	1.2
Little Hunting Creek	2.07
<b>Total</b>	<b>8.9</b>

<sup>1</sup>The 100-year floodplain acreage within the LOD is a conservative impact estimate based on the assumption the crossing would consist of roadway fill. If the Build Alternative is implemented, it is expected refined designs for these crossings in later project phases would reduce the potential encroachment to floodplains. The Build Alternative would be designed in accordance with 23 FR § 650 Subpart A and Sections 107 and 303 of VDOT's specifications to minimize floodplain encroachment.

The Build Alternative is consistent with local land use plans and is not projected to either encourage or accelerate growth or changes in land use within floodplains. Therefore, the Build Alternative would not encourage, induce, allow, serve, support, or otherwise facilitate incompatible base floodplain development.

The proposed replacement of the existing Dogue Creek short-span bridge with a longer and higher bridge could improve floodplain connectivity and alter flood flow elevations. Efforts to minimize floodplain encroachment would be considered during advanced design to avoid or minimize impacts on natural and beneficial floodplain values. The Build Alternative's water crossings would be designed consistent with procedures for the location and hydraulic design of highway encroachments on floodplains contained in 23 CFR § 650 Subpart A Location and Hydraulic Design of Encroachments on Flood Plains. In addition, the Build Alternative would be designed in accordance with Sections 107 Legal Responsibilities and 303 Earthwork of VDOT's Road and Bridge specifications.

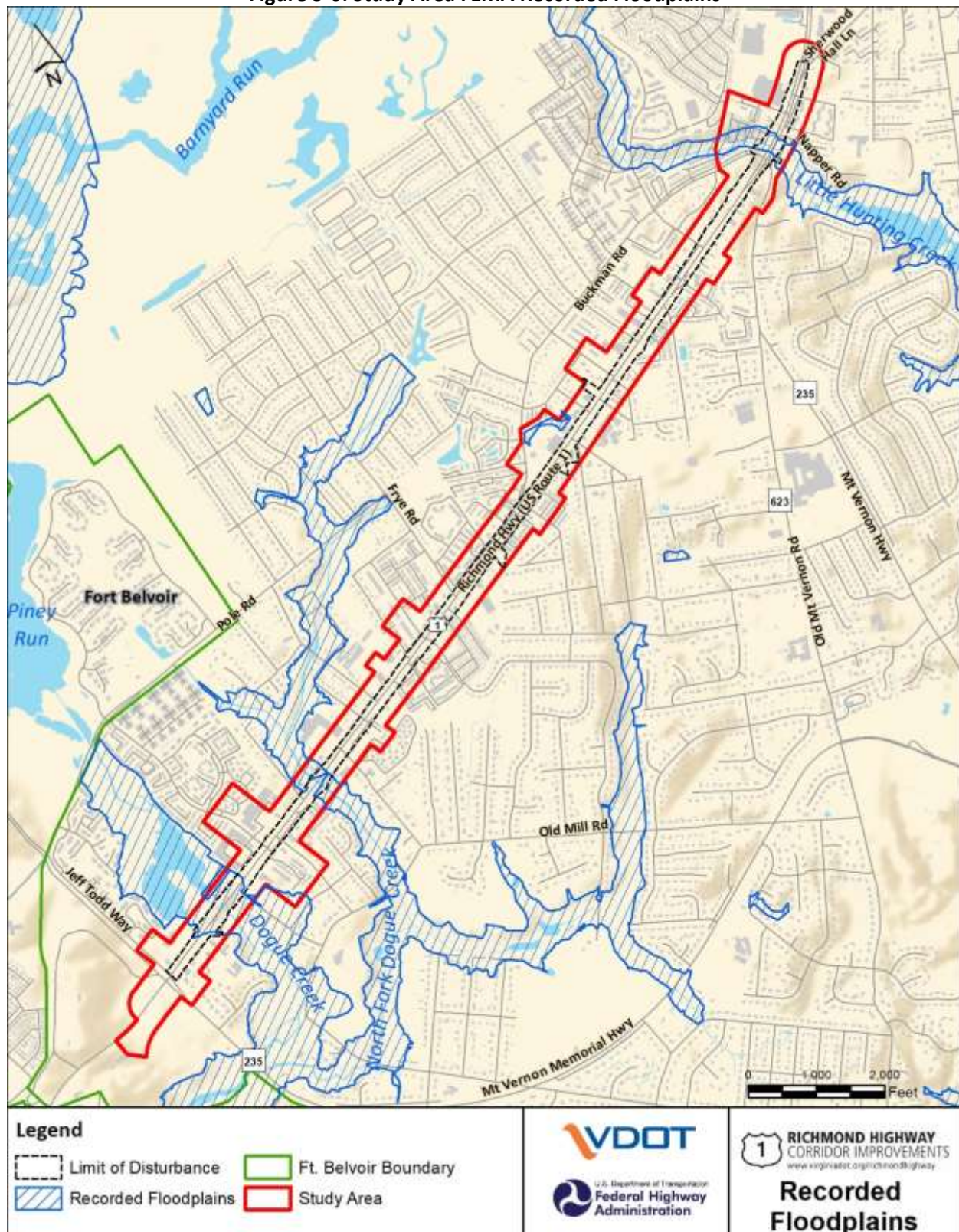
Therefore, the Build Alternative is not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life.

### **3.4.5 Chesapeake Bay Preservation Act Requirements**

The Chesapeake Bay Preservation Act (CBPA) requires local governments in the coastal zone to include water quality protection measures in their zoning and subdivision ordinances and in their comprehensive plans (VDEQ, 2016a). Within the Chesapeake Bay watershed of coastal counties, Resource Protection Areas (RPAs) include tidal wetlands, tidal shores, waterbodies with perennial flow, and non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or perennial water bodies, as well as a 100-foot vegetated buffer area located adjacent to and landward of these features. Resource Management Areas (RMAs) include those lands contiguous to the inland boundary of the RPA, which if improperly used



**Figure 3-6: Study Area FEMA Recorded Floodplains**





or developed, has the potential to degrade water quality or diminish functions of the RPA. RMAs include floodplains, highly erodible soils (including steep slopes), highly permeable soils, non-tidal wetlands not included in RPAs, and any other sensitive lands considered by the local government to be necessary to protect the quality of water resources (9 Virginia Administrative Code [VAC] 25-830-90).

### **Existing Conditions**

The Study Area is within the Chesapeake Bay watershed. The RPAs and RMAs are concentrated adjacent to the Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek stream corridors in the Study Area.

### **Environmental Consequences**

#### *No-Build Alternative*

The No-Build Alternative would not impact CBPA areas.

#### *Build Alternative*

Although RPAs and RMAs occur in the Study Area, public roads and their appurtenant structures are conditionally exempt from regulation under 8VAC25-830-150. The exemption of public roads is further conditioned on the optimization of the road alignment and design, consistent with other applicable requirements, to prevent or otherwise minimize encroachment in the RPA and adverse effects on water quality. Under Chapter 118 Article 5-2 of the Fairfax County Code of Ordinances, in conformance with Virginia Administrative Code 9VAC25-830-150, public roads are exempted from the CBPA conditioned on: (1) compliance with regulations promulgated pursuant to the Erosion and Sediment Control Law and with Chapter 104 of the County Code and the Virginia Stormwater Management Act and with Chapter 124 of the County Code; (2) an erosion and sediment control plan and a stormwater management plan approved by the VDCR; or (3) local water quality protection criteria at least as stringent as the above state requirements will be deemed to constitute compliance with this chapter. The exemption of public roads is further conditioned on the optimization of the road alignment and design, consistent with other applicable requirements, to prevent or otherwise minimize encroachment in the RPA and adverse effects on water quality.

Since all public roads in the Study Area would meet the exemption conditions, they would not be under the CBPA purview under the Build Alternative. Therefore, if the above conditions are met, no additional avoidance or minimization for CBPA areas would be necessary under the Build Alternative.

### **3.4.6 Virginia Coastal Zone Management Program**

The Virginia Coastal Zone Management Program (CZMP) is a network of Virginia state agencies and local governments which administers enforceable laws, regulations, and policies that protect Virginia's coastal resources and foster sustainable development. Federal projects occurring within any land or water use, or natural resource of a State's coastal zone, including cumulative and secondary impacts, must be consistent with the State's federally approved CZMP per Section 307 of the Federal Coastal Zone Management Act of 1972, as amended, and NOAA regulations (15 CFR § 930).

### **Existing Conditions**

The Study Area is located within Virginia's coastal zone. As such, since this project would receive federal funding for construction and require federal approval, the project must be consistent with the applicable Enforceable Regulatory Programs that comprise Virginia's CZMP (VDEQ, 2016b). When the USACE reviews a Joint Permit Application for impacts to WOUS, the USACE will require that the applicant demonstrate consistency with these enforceable programs of the CZMP.

### Environmental Consequences

#### *No-Build Alternative*

Under the No-Build Alternative, no improvements to Richmond Highway in the Study Area would occur other than routine maintenance. Thus, no project-related impacts to coastal resources would occur.

#### *Build Alternative*

The Build Alternative would disturb additional land within Virginia's coastal zone. The Build Alternative construction would be consistent with the applicable Enforceable Regulatory Programs that comprise Virginia's CZMP.

### **3.4.7 Topography and Soils**

The Study Area is in the Coastal Plain region. The province consists of unconsolidated sand, silt and clay and gravel strata deposited by ancient oceans and rivers. The overall drainage pattern in the Study Area is to the southeast and is a broad, nearly level area.

The boundary of the Study Area was established as the Area of Interest (AOI) using the Natural Resources Conservation Service Web Soil Survey. The Study Area's base soil data was taken from the resulting soil map and soil data explorer and referenced to the mapping in the Description and Interpretive Guide to Soils in Fairfax County prepared by Fairfax County Public Works and Northern Virginia Soil and Water Conservation District (Fairfax County, 2013).

**Table 3-13** shows the soil types in the Study Area and their erosion potential. Highly erodible soils within the Study Area include the Kingstowne-Sassafras-Marumsco complex and Sassafras-Marumsco complex (**Figure 3-7**). Hydric soils in the Study Area are identified in **Table 3-13** and shown in **Figure 3-8**.

**Table 3-13: Study Area Soil Types**

Fairfax County, VA (VA059)					
Map Unit Symbol	Map Unit Name	Acre(s) in Study Area	Percent of Study Area	Erosion Potential	Hydric Soil Components (%)
40	Grist Mill sandy loam, 0 to 25 percent slopes	0.6	0.2%	Moderate	0
95	Urban land	178.4	58.8%	N / A	0
98	Urban land-Grist Mill	34.8	11.5%	Moderate	0
100	Urban land-Kingstowne complex	9.7	3.2%	Moderate	0
103A	Wheaton-Codorus complex, 0 to 2 percent slopes	2.8	0.9%	Low	5
30A	Codorus and Hatboro soils, 0 to 2 percent slopes, occasionally flooded	14.1	4.7%	Low	35
43A	Grist Mill-Gunston complex, 0 to 2 percent slopes	4.1	1.3%	Low	8

Fairfax County, VA (VA059)					
46B	Grist Mill-Mattapex complex, 2 to 7 percent slopes	13.0	4.3%	Low	3
67B	Kingstowne-Beltsville complex, 2 to 7 percent slopes	22.8	7.5%	Low	0
70C	Kingstowne-Sassafras complex, 7 to 15 percent slopes	1.5	0.5%	Moderate	0
71C	Kingstowne-Sassafras-Marumsco complex, 7 to 15 percent slopes	1.0	0.3%	High	0
77B	Mattapex loam, 2 to 7 percent slopes	20.6	6.8%	Moderate	3
91C	Sassafras-Marumsco complex, 7 to 15 percent slopes	0.2	0.1%	High	0
<b>Total</b>		<b>303.5</b>	<b>100.0%</b>	<b>N / A</b>	<b>N / A</b>

### Environmental Consequences

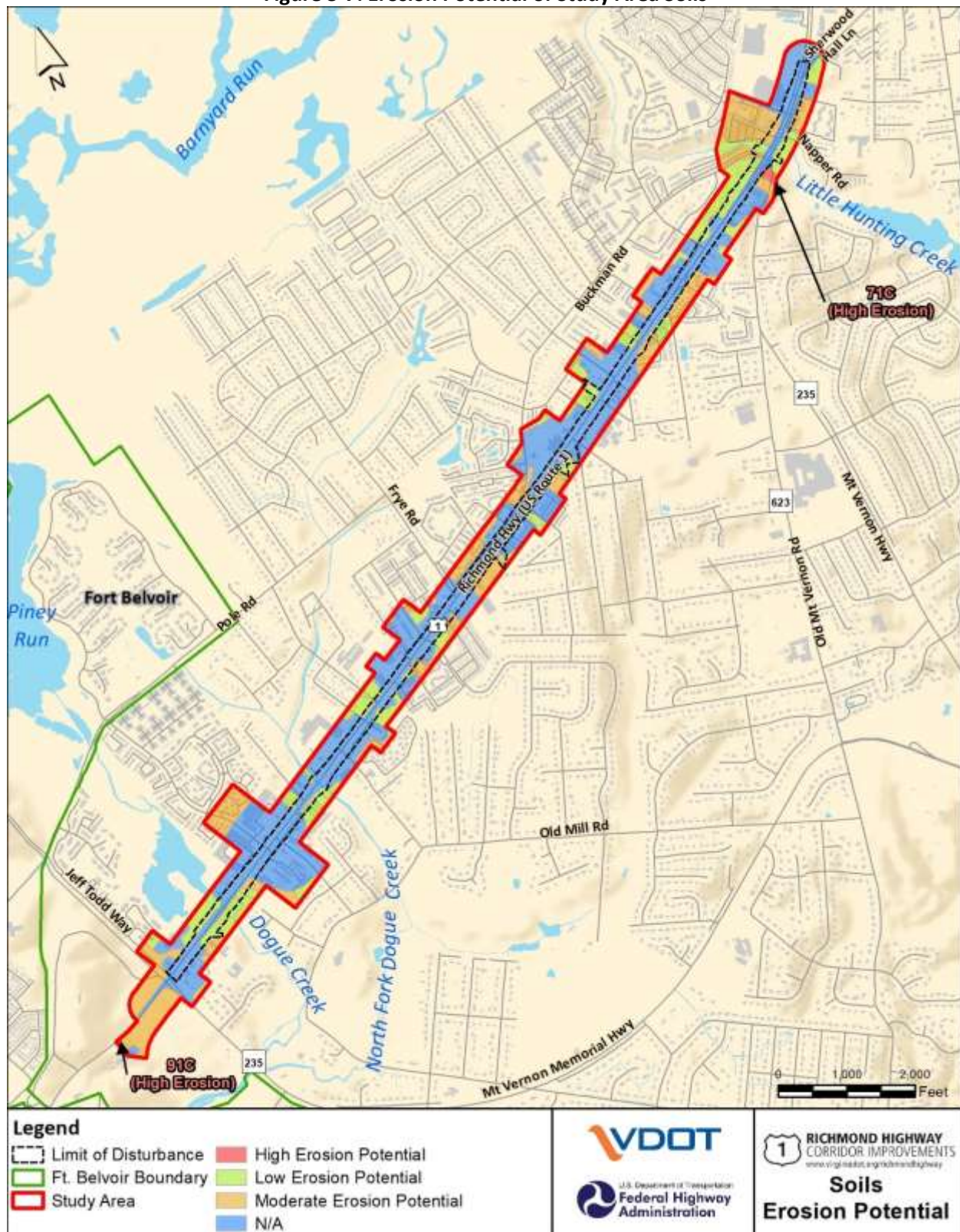
#### *No-Build Alternative*

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. Thus, no project-related effects to soils in the area are anticipated.

#### *Build Alternative*

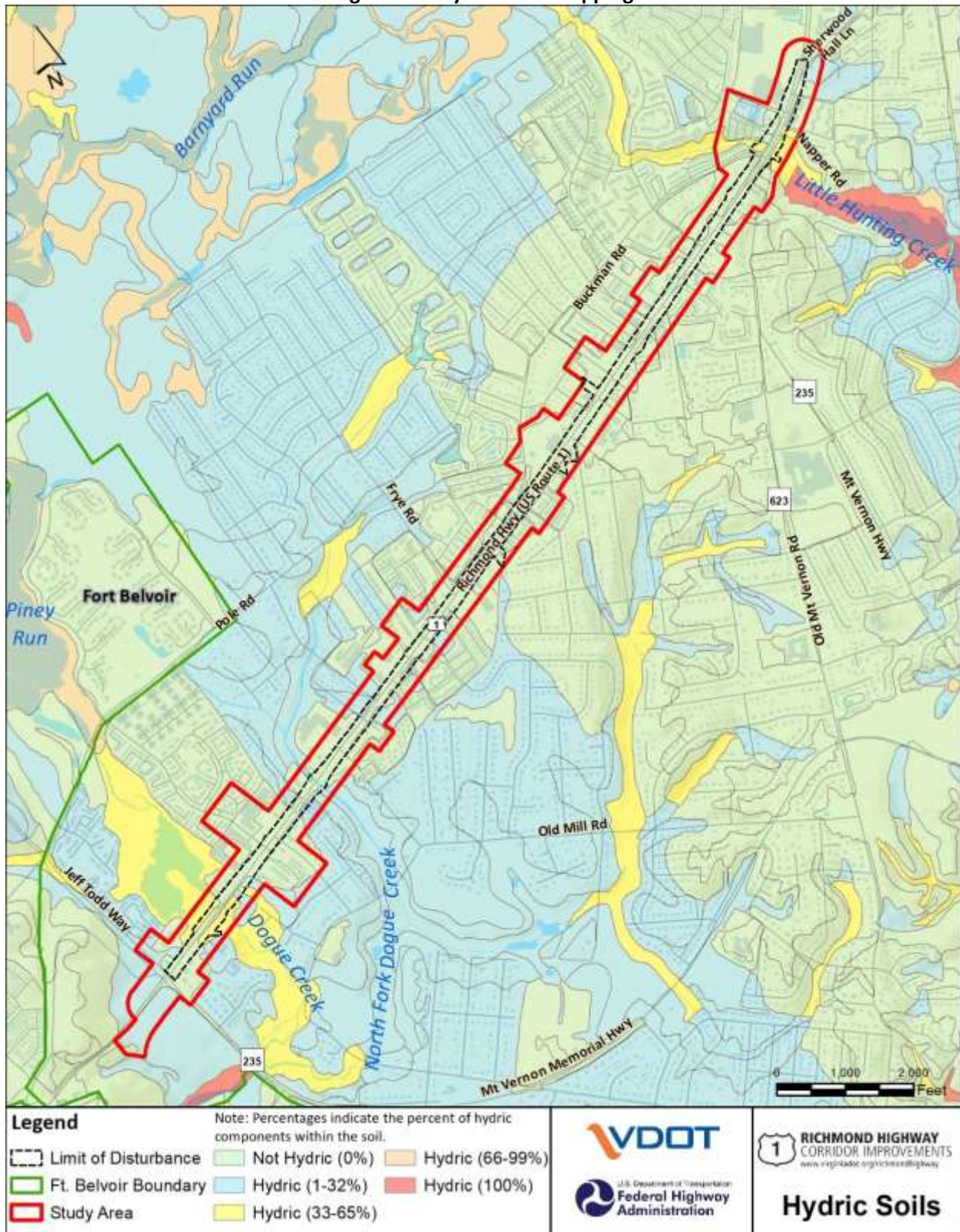
The Build Alternative could encounter two highly erodible soil types (**Table 3-13** and **Figure 3-7**); however, over 70 percent of the soils in the Study Area are urban soils and present a low to moderate erosion potential. The topography is nearly level, thus deep cuts or fills are not anticipated under the Build Alternative. The design of the Build Alternative would ensure that bank erosion and highly erodible soils would be addressed prior to construction. The project would be designed in accordance with the Virginia Erosion and Sediment Control Handbook and a Virginia Stormwater Water Management permit would be required for the project. Therefore, construction of the Build Alternative would not substantially adversely impact soils that would be managed in accordance with Virginia regulatory programs.

**Figure 3-7: Erosion Potential of Study Area Soils**





**Figure 3-8: Hydric Soils Mapping**





### 3.4.8 Vegetation

#### Existing Conditions

##### *Invasive Species*

In accordance with Executive Order 13112, Invasive Species, as amended, no federal agency can authorize, fund, or carry out any action that the agency believes is likely to cause or promote the introduction or spread of invasive species. Other regulations in governing invasive species include the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990 (as amended), Lacey Act of 1900 (as amended), Plant Protection Act of 2000, Federal Noxious Weed Act of 1974 (as amended), and the Endangered Species Act of 1973 (as amended). Likewise, the State of Virginia acted in 2003 to amend the Code of Virginia by adding the Nonindigenous Aquatic Nuisance Species Act, which, among other things, addresses the development of strategies to prevent the introduction of, to control, and to eradicate invasive species.

#### **Plants**

The VDCR-DNH, in association with the Virginia Native Plant Society, have identified and listed hi invasive plant species that are known to currently threaten Virginia's natural populations. The Study Area is located within the Coastal Plain region. The highly invasive plant species identified at the WOUS field investigation data points include:

- lesser celandine (*Ficaria verna*)
- multiflora rose (*Rosa multiflora*)
- Japanese stiltgrass (*Microstegium vimineum*)
- Japanese honeysuckle (*Lonicera japonica*)

More information on invasive species can be found on the VDCR-DNH website at: <http://www.dcr.virginia.gov/natural-heritage/> and the Virginia Native Plant Society website at: <https://vnps.org/conservation/invasives/invasive-alien-plant-species/>

#### **Animals**

Many aquatic and terrestrial animal species threaten the native plant and animal communities in Virginia. The VAC (4VAC15-20-160) designates the following as nuisance species in Virginia, which are likely to occur within the Study Area. However, none of these species were documented as being observed during field investigations. These species are listed as established in Virginia and include:

- |   |   |
|---|---|
| • house mouse ( <i>Mus musculus</i> )     | • woodchuck ( <i>Marmota monax</i> )            |
| • Norway rat ( <i>Rattus norvegicus</i> ) | • European starling ( <i>Sturnus vulgaris</i> ) |
| • black rat ( <i>Rattus rattus</i> )      | • English sparrow ( <i>Passer domesticus</i> )  |
| • coyote ( <i>Canis latrans</i> )         | • pigeon ( <i>Columba livia</i> )               |
| • nutria ( <i>Myocastor coypus</i> )      |   |

Likewise, the VDCR-DNH has identified invasive species which threaten Virginia's wildlife and plant systems such as the:

- emerald ash borer (*Agrilus planipennis*),
- northern snakehead fish (*Channa argus*),
- rapa welk (*Rapana venosa*),
- imported fire ant (*Solenopsis invicta*).

In addition, the VDCR-DNH has also identified the Zebra mussel (*Dreissena polymorpha*), Sirex woodwasp (*Sirex noctilio* F.), rusty crayfish (*Orconectes rusticus*), and the Chinese mitten crab (*Eriocheir sinensis*) as species that may threaten Virginia's wildlife and plant systems; however, they are not well established in the Commonwealth.

#### *Submerged Aquatic Vegetation*

Submerged Aquatic Vegetation (SAV) beds are an important component of the Chesapeake Bay ecosystem and barometer for water quality as they filter polluted runoff, provide essential habitat for all life stages of numerous aquatic species, and provide a valuable food source for waterfowl (Virginia Institute of Marine Science [VIMS], 2016).

Species of SAV most commonly found in the Chesapeake Bay and its tributaries within the vicinity of the Study Area include eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*). Other species, less likely to occur due to their association with freshwater and lower salinity levels, include wild celery (*Vallisneria americana*), hydrilla (*Hydrilla verticillata*), redhead grass (*Potamogeton perfoliatus*), sago pondweed (*Stuckenia pectinata*), and Eurasian watermilfoil (*Myriophyllum spicatum*) (Orth et al., 2015).

Mapping indicates that existing SAV beds occur downstream of the Study Area within Dogue Creek and the Potomac River (Orth et al., 2011 and 2012; Orth et al., 2013 and 2014).

### **Environmental Consequences**

#### *No-Build Alternative*

The No-Build Alternative would not involve any construction on Richmond Highway within the Study Area other than routine maintenance, or changes to the natural environment; therefore, no project-related changes regarding invasive species or SAV conditions would occur.

#### *Build Alternative*

### **Invasive Species**

The Build Alternative has the potential to introduce invasive species, particularly those species noted above. While most of the area within the LOD is previously disturbed by a myriad of development activities, the disturbance of natural areas as well as the removal and transfer of fill from borrow sites within the LOD or offsite locations could spread invasive species. The introduction of plant and animal invasive / nuisance species could occur from vehicles transporting these species or their seed. Offsite borrow and disposal areas, staging areas, and access roads could contribute similarly to the spread or introduction of these species. In accordance with Executive Order 13112, Invasive Species, the spread of invasive species under the Build Alternative would be minimized by adhering to provisions in VDOT's Road and Bridge Specifications. The addition of invasive animal species is expected to be minimal because much of the construction under the Build Alternative would be along existing disturbed corridors.

The invasive species are not anticipated to impact pollinators or pollinator habitat as the study area is in a densely populated urban area that has been previously disturbed; therefore, the area does not currently support much pollinator habitat. Pollinator species could include honey bees, native birds, bats, and butterflies. These pollinator species could be considered in the development of the seed mix for landscaping. The VDOT Pollinator Habitat Program is in development and currently focuses on rest areas and park and rides along state-maintained roadways.

### **Submerged Aquatic Vegetation**

No SAV are within the Study Area or LOD, therefore no direct effects to SAV would occur under the Build Alternative. See the *Indirect and Cumulative Effects Technical Report (VDOT, 2017g)* that describes the potential downstream effects of construction to SAV and best management practices to minimize adverse indirect effects.

## **3.5 CULTURAL RESOURCES**

### **3.5.1 Methodology**

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (54 U.S.C. § 306108) and its implementing regulations at 36 CFR § 800, potential effects to archaeological and architectural historic properties that are listed in, eligible for, or potentially eligible for the National Register of Historic Places (NRHP) have been analyzed within the Area of Potential Effect (APE) for the Richmond Highway Corridor Improvements project. VDOT and FHWA have coordinated Section 106 findings and determinations with consulting parties in accordance with 36 CFR § 800.2-§ 800.13.

Prior to undertaking the technical studies, the APE was defined for the Build Alternative. The APE is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. For this project, within the southern and northern project limits, the archaeological APE generally corresponds to an area within 190 feet either side of existing Richmond Highway centerline. Additional areas included are along the legs of intersecting roads (within 50 feet of pavement) and / or for access management. For the purposes of Section 106, these areas constitute the APE for direct effects on archaeological historic properties.

The APE for architectural resources is generally 300 feet to either side of Richmond Highway, and parcels abutting intersecting road improvements, including access management. This area comprises the geographic area in which the undertaking may directly or indirectly cause impacts to historic properties. The Virginia Department of Historic Resources (VDHR), the State Historic Preservation Officer (SHPO) in Virginia, concurred with the definition of the project's APE in September 2016 and for a later expansion in May 2017 (see **Appendix C: Agency Coordination**).

Several public comments were received concerned that the viewshed of Fairfax County's Historic Huntley Plantation may potentially be impacted by the Build Alternative, and thus, should be in the APE. The Huntley Plantation is a 19th century homestead owned and managed by the Fairfax County Park Authority located about a half-mile west of Richmond Highway at 6918 Harrison Lane. The site is listed on the National Register of Historic Places, the Virginia Landmarks Register, and the Fairfax County Inventory of Historic Sites. Although the plantation is 1.6 miles to the north of the Study Area, it is in a hilly area with expansive views to the south. To evaluate whether the APE should be expanded, a GIS visibility assessment tool was used to determine if the proposed Richmond Highway (Route 1) Corridor Improvement Project is within the viewshed of the Huntley Plantation. The analysis used Light Detection and Ranging (LiDAR) data and assumed the potential maximum bridge heights (15 feet above existing bridge height) would be the highest features to analyze that would be a changed condition from the existing setting of Richmond Highway that already has signal, lighting, and utility poles along the roadway through the Study Area. **Appendix D** presents the map showing locations that would have a view of the proposed improvements at a maximum 15 feet higher than existing conditions at the Dogue Creek, North Fork Dogue Creek and Little Hunting Creek bridges. The analysis found the project is outside of the viewshed of the Huntley Plantation with no potential to directly or indirectly affect this historic property.

Phase I surveys for archaeological and architectural resources have been completed in accordance with VDHR's *Guidelines for Conducting Cultural Resource Survey in Virginia* (VDHR 2011) and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*. Cultural resources were evaluated for their eligibility for listing on the NRHP in accordance with 36 CFR § 60.4.

### 3.5.2 Existing Conditions

#### Archaeological Resources

Within the APE, a literature search for previously identified archaeological surveys and sites was conducted using VDHR archival sources. A Phase I cultural resources survey was performed in the APE to identify archaeological resources in areas not previously surveyed and to relocate previously identified resources to assess their current condition. See the *Cultural Resources Survey for the Widening of US Route 1 from Napper Road to Mount Vernon Highway* (Goode et al., 2016) and *Supplemental Cultural Resources Survey for the Widening of US Route 1 from Napper Road to Mount Vernon Highway* (Goode et al., 2017) reports for detailed descriptions of this effort. Three previously identified archaeological sites were investigated, of which two have been destroyed by development, and the remaining site found not eligible for the NRHP by VDHR. No other archaeological sites were found by the Phase I pedestrian survey or shovel testing. VDHR concurred with these findings in November 2016 and May 2017 (see **Appendix C: Agency Coordination**).

#### Architectural Resources

Background research and VDHR site records searches were conducted to identify previously recorded architectural resources within the APE. A Phase I survey to identify architectural resources in areas not previously surveyed and relocate previously recorded resources found 159 architectural resources, of which four had been previously demolished (C.V. Goode et al., 2016; C. Goode et al., 2017). Of the remaining 155 architectural resources in the APE, four are either eligible for, potentially eligible for, or listed on the NRHP (**Table 3-14**). In addition, Woodlawn Plantation (029-0056) is also a designated National Historic Landmark.

No other assemblage of buildings that merits further study or could comprise a historic district is within the project APE. No American Battlefield Protection Program Potentially National Register eligible lands are in the APE.

**Table 3-14: Historic Properties within the APE**

Resource	VDHR <sup>1</sup> Number	Description	NRHP Eligibility
Woodlawn Plantation	029-0056	Circa 1800 plantation	National Historic Landmark, NRHP Listed, Contributing to Woodlawn Cultural Landscape District
Original Mount Vernon High School (OMVHS)	029-0230	1939 Colonial Revival Former High School	Listed
Woodlawn Cultural Landscape Historic District	029-5181	Rural cultural landscape associated with Woodlawn Plantation and	Potentially Eligible (considered by VDOT to be eligible for the NRHP for the purposes of Section 106 for this project)

Resource	VDHR <sup>1</sup> Number	Description	NRHP Eligibility
		George Washington's Mount Vernon (1799-1964)	
Sharpe Stable Complex	029-5181-0005	Circa 1913-1997 bank barn, riding rink, and paddocks	Individually Potentially Eligible, Contributing to Woodlawn Cultural Landscape District

### 3.5.3 Environmental Consequences

#### **No-Build Alternative**

No project-related improvements to Richmond Highway would occur under the No-Build Alternative, thus, no impact to archaeological or architectural resources would occur.

#### **Build Alternative**

The only historic property within the Build Alternative's direct LOD is the Original Mount Vernon High School (OMVHS) designated VDHR # 029-0230. VDOT has coordinated with Fairfax County who participated as a consulting party in the Section 106 of the NHPA compliance process for the proposed project. The NRHP boundary of the school property is anticipated to be truncated by approximately 50 to 60 feet along the property's frontage with Richmond Highway. This area currently is the location of a circular entrance driveway and parking area that appears to have been constructed sometime during 1951-1953. Comparison of historic aerials indicate the circular driveway has had several modifications from its original appearance. Also, the original purpose of the circular driveway as a school bus drop off location has been eliminated with the closing of the county school in the mid-1980s. These events indicate the physical integrity of the historic setting and feeling of the circular driveway feature has been previously diminished and no longer conveys its historic significance. However, in recognition of the importance of the OMVHS to the county and local community, VDOT/FHWA have made a finding of no adverse effect to the historic Original Mount Vernon High School, based in part on completing an oral history of the school and interpretive signing at the site, to which the DHR and the County have concurred. Based on these commitments, the SHPO has concurred with the finding that although the Build Alternative would have an effect on the OMVHS historic property, the effect would not be adverse (see **Appendix C: Agency Coordination**).

Woodlawn Plantation (029-0056), the Woodlawn Cultural Landscape Historic District (029-5181) and the Sharpe Stable Complex (029-5181-0005) are situated in the southern terminus of the Build Alternative that would widen the median enough to accommodate BRT as called for in the DRPT Multimodal Study / Fairfax County Board of Supervisors Resolution.

Although a change in views from portions of these historic properties toward the southern terminus of the project would occur, this change would not diminish any aspects of integrity as existing conditions have previously diminished the historic setting and feeling of this area due to a major intersection upgrade, including previous widening of Jeff Todd Way and the Mount Vernon Memorial Highway ( VA 235) in 2013 to 2014, and recent widening and partial realignment of Richmond Highway south of Jeff Todd Way. Although the Build Alternative would have an indirect effect to these historic properties, the



effect would not be adverse. The SHPO has concurred with these findings (see **Appendix C: Agency Coordination**) and no further comments from consulting parties other than from Linda Blank of Fairfax County regarding the OMVHS were received, which VDOT has addressed to her satisfaction.

### 3.6 AIR QUALITY

NEPA requires consideration of whether the proposed action would have an adverse effect on air quality in the Study Area. Accordingly, qualitative carbon monoxide (CO), Mobile Source Air Toxics (MSATs), and indirect effects and cumulative impacts analyses have been prepared. This analysis included the application of the *VDOT-FHWA Programmatic Agreement (PA) for Project-Level Air Quality Analyses for CO* (VDOT, 2016c)<sup>2</sup> to screen intersections for CO impacts.

#### 3.6.1 Existing Conditions

##### Regional Air Quality Status

The USEPA Green Book shows that Fairfax County is designated as a nonattainment area for ozone and an attainment area for all other National Ambient Air Quality Standards (NAAQS).<sup>3</sup>

As the Study Area is in a nonattainment area for ozone, federal conformity requirements (specifically 40 CFR § 93.114 and 40 CFR § 93.115) for regional conformity (not project-level) apply. More specifically, there must be a currently conforming transportation plan and program at the time of the project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CFR § 93.109(b)).

##### Transportation Plan and Program Status

The project is included in the NC RTPB (federally-designated metropolitan planning organization for metropolitan Washington) Visualize 2045 CLRP<sup>4</sup> (ID 1942) (NC RTPB, 2016a), and the Fiscal Year (FY) 2019 – 2024 TIP<sup>5</sup> (ID 6443) (NC RTPB, 2016b). The project is found in the Visualize 2045 Air Quality Conformity Analysis<sup>6</sup> as Project ID VP1U and Con ID 322 (NC RTPB, 2016c).

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<sup>2</sup> See: [http://virginiadot.org/projects/environmental\\_air\\_section.asp](http://virginiadot.org/projects/environmental_air_section.asp)

<sup>3</sup> While the DC-MD-VA area (including Fairfax County) county was previously designated a maintenance area for fine particulate matter (PM<sub>2.5</sub>) for the 1997 primary annual standard, that standard was revoked by the USEPA in 2016. The region is therefore now in attainment of the NAAQS for PM<sub>2.5</sub>. More specifically, USEPA revoked the 1997 annual primary NAAQS for PM<sub>2.5</sub> in its final rule (81 FR 58010) (issued August 24, 2016, effective October 24, 2016) on “*Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*.” The final rule states: “... USEPA is revoking the 1997 primary annual standard for areas designated as attainment for that standard because the USEPA revised the primary annual standard in 2012.” Accordingly, the DC-MD-VA area (including Fairfax County) is no longer designated maintenance for PM<sub>2.5</sub>, and the associated USEPA regulatory requirements for conformity for PM<sub>2.5</sub> are eliminated for northern Virginia.

<sup>4</sup> See: <https://www.mwcog.org/visualize2045/document-library/>

<sup>5</sup> See: <https://www.mwcog.org/documents/2018/10/17/fy-2019-2024-transportation-improvement-program-tip-visualize-2045/>

<sup>6</sup> See: <https://www.mwcog.org/documents/2018/10/17/visualize-2045-air-quality-conformity-analysis/>

### 3.6.2 Environmental Consequences

#### **No-Build Alternative**

##### *Transportation Conformity*

The No-Build Alternative includes continued road maintenance and repairs of existing transportation infrastructure within the Study Area. The No-Build Alternative would not be consistent with the NC RTPB's Visualize 2045 CLRP<sup>7</sup> or the FY 2019 – 2024 TIP<sup>8</sup>.

##### *Carbon Monoxide*

Analysis of the No-Build Alternative for CO is not required, per the FHWA-VDOT 2009 Agreement for No-Build Analyses. Based on that Agreement, analysis of the No-Build scenario is not required for projects that qualify for an EA under NEPA.

##### *Mobile Source Air Toxics*

USEPA's vehicle and fuel regulations are expected to result in substantially lower MSAT levels in the future than exist today due to cleaner engine standards coupled with fleet turnover. The magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Study Area will be substantially lower in the future than they are today.

#### **Build Alternative**

##### *Transportation Conformity*

The project is included in the NC RTPB's Visualize 2045 CLRP (ID 1942), and the FY 2019 – 2024 TIP (ID 6443). The project is found in the Visualize 2045 Air Quality Conformity Analysis<sup>9</sup> as Project ID VP1U.

##### *Carbon Monoxide*

As the project is in a region that is in attainment of the NAAQS for CO, only NEPA applies, and USEPA project-level ("hot-spot") transportation conformity requirements do not apply. For purposes of NEPA, the potential for CO impacts from the project in terms of potential violations of the NAAQS was assessed and no potential impacts were identified. More specifically, each of the 11 Study Area intersections were considered for project-specific modeling. All were determined to not require project-specific modeling but could be instead screened out using a weight-of-evidence approach and / or the "worst-case" modeling that forms the basis for the *VDOT-FHWA Programmatic Agreement for Project-Level Air Quality Analyses for Carbon Monoxide*. As such, the project would not cause or contribute to a violation of the CO NAAQS within the Study Area.

##### *Mobile Source Air Toxics*

A qualitative analysis was conducted for MSATs as the Build Alternative is considered a minor-widening project where the design year traffic is projected to be less than the 140,000 to 150,000 annual average daily traffic (AADT) threshold noted in the *Updated Interim Guidance on MSAT Analysis in NEPA Documents* (2016). Therefore, this project is best characterized as one with "Low Potential MSAT Effects".

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<sup>7</sup> See: <https://www.mwcog.org/visualize2045/document-library/>

<sup>8</sup> See: <https://www.mwcog.org/documents/2018/10/17/fy-2019-2024-transportation-improvement-program-tip-visualize-2045/>

<sup>9</sup> See: <https://www.mwcog.org/documents/2018/10/17/visualize-2045-air-quality-conformity-analysis/>

As noted above, best available information indicates that, nationwide, regional levels of MSATs are expected to decrease in the future due to ongoing fleet turnover and the continued implementation of increasingly more stringent emission and fuel quality regulations. The technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects effectively limit meaningful or reliable estimates of MSAT emissions and effects of this project at this time.

It is possible that localized increases in MSAT emissions may occur as a result of this project. For example, there may be localized areas where ambient concentrations of MSATs could be higher under the Build Alternative than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections along Richmond Highway. Even in these locations, however, emissions will likely be lower than present levels in the design year of this project as a result of the USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050.

Although local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

#### *Greenhouse Gases*

With the recent withdrawal of federal guidance addressing greenhouse gas (GHG) analyses and climate change<sup>10</sup>, the Department protocol (VDOT Resource Document, Section 4.7)<sup>11</sup> for GHG analyses was reviewed for applicability to this project. Based on that protocol, a GHG analysis is not warranted for this project as it involves an EA and not an EIS.

#### *Indirect Effects and Cumulative Impacts*

The CO and MSAT assessments conducted for the project are considered indirect effects analyses because they take into account air quality impacts attributable to the project that occur at a later time in the future. These qualitative assessments indicate that the potential for indirect effects associated with the project are not expected to be significant.

The annual regional conformity analysis (Visualize 2045 Air Quality Conformity Analysis) conducted by the NC RTPB represents a cumulative impact assessment for purposes of regional air quality. The existing air quality designations for the region are based, in part, on the accumulated mobile source emission from past and present actions, and these pollutants serve as a baseline for the current conformity analysis. That conformity analysis quantifies the amount of mobile source emissions for which the area is designated nonattainment / maintenance that will result from the implementation of all reasonably foreseeable (i.e., those proposed for construction funding over the life of the region's transportation plan) and regionally significant transportation projects in the region.

As noted above, the conformity analysis conducted for the Visualize 2045 CLRP and FY 2019-2024 TIP includes the project. Therefore, this demonstrates that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the State Implementation Plan (SIP) and will not cause

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<sup>10</sup>See: <https://www.federalregister.gov/documents/2017/04/05/2017-06770/withdrawal-of-final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas>

<sup>11</sup> Available from the VDOT website referenced above for the FHWA-VDOT Programmatic Agreement for CO.

or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by the USEPA.

Overall, the potential for indirect and cumulative effects of the project is not expected to be significant.

### *Mitigation*

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*<sup>12</sup>.

The VDEQ provides general comments for projects by jurisdiction. Their comments in part address mitigation. For Fairfax County, VDEQ comments relating to mitigation are<sup>13</sup> *“...all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions<sup>14</sup>; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions<sup>15</sup>; and 9 VAC 5-50, Article 1, Fugitive Dust precautions<sup>16</sup>.”*

## **3.7 NOISE**

### **3.7.1 Existing Conditions**

A preliminary noise evaluation was performed, and a more detailed review will be completed during final design. As such, noise barriers that are found to be feasible and reasonable during the preliminary noise analysis may also not be found to be feasible and reasonable during the final design noise analysis. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be recommended for construction.

This study details the noise impact and mitigation assessment for the Existing Conditions (2016) and for design year (2045) No-Build and Build Alternatives. The traffic data used in the noise analysis is based upon VDOT's environmental traffic data (ENTRADA) analysis program. The worst noise hour was derived through an analysis of 15 am and pm hours, which were then narrowed to the 7am, 3pm and 4pm hours by further analysis. Traffic volumes and speeds for those hours were modeled in FHWA's Traffic Noise Model (TNM), and the 3pm hour was determined to produce the highest noise levels.

Numerous noise sensitive land uses exist on both northbound and southbound sides of Richmond Highway in the Study Area. See **Table 3-15** for a summary of predicted worst-hour noise level ranges.

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<sup>12</sup> See: <http://www.virginiadot.org/business/const/spec-default.asp>

<sup>13</sup> Spreadsheet entitled: “DEQ SERP Comments rev8b”, March 2017, downloaded from the online data repository for the VDOT Resource Document. See: [http://www.virginiadot.org/projects/environmental\\_air\\_section.asp](http://www.virginiadot.org/projects/environmental_air_section.asp)

<sup>14</sup> See: <http://law.lis.virginia.gov/admincode/title9/agency5/chapter130/>

<sup>15</sup> See: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-45-760>

<sup>16</sup> See: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

**Table 3-15: Predicted Worst-Hour Noise Levels for Modeled Receptors**

CNE 1 ID	NAC Leq(h) <sup>2</sup>	Area Land Use and Description	Range of Predicted Worst-Hour Leq <sup>3</sup> Exterior Noise Levels, dB(A) <sup>4</sup>		
			Existing 2016	No-Build 2045	Build 2045
01	72	Candlewood Suites and Hampton Inn hotels	52-64	53-65	52-65
02	67	Best Western hotel and Belvoir Plaza Apartments	40-58	41-60	44-60
03	67	Residences on Talbott Farm Drive	47-61	48-63	52-68
04	67	Residences on Lukens Lane	51-51	52-52	53-53
05	67	Residences at Terrace Towne Homes on Walutes Circle	44-57	46-58	46-58
06	67	Residences on Wyngate Manor Court, Washington Square Apartments	39-64	41-66	42-68
07	67	Residences at Ray's Mobile Colony	51-65	52-66	53-67
08	67	Residences on Halfe Street and Radford Avenue	50-59	52-61	53-62
09	67	Mount Zephyr community of residences on Sonia Court	40-61	41-62	43-66
10	67	Residences and daycare center on Mohawk Lane and Washington Avenue	53-69	55-71	56-72
11	67	Residences on Reddick Avenue	56-59	57-60	57-60
12	67	Residences on Central Avenue and Mary Evelyn Way	35-60	36-61	36-63
13	67	Residences in Parkside at Mount Vernon community, Vernon Heights Park	41-67	43-68	43-69
14	67	Spring Hills Mount Vernon assisted living facility	44-47	45-49	45-46
15	67	Residences on Shannons Green Way and Lamberts Lane	50-52	52-54	50-53
16	67	Residences on Mount Vernon Highway (southbound)	53-59	54-60	54-60
17	67	Residences on Mount Vernon Highway (northbound)	56-62	58-64	58-64
18	67	Residences on Napper Road and Brown Court, Little Hunting Creek Park	54-71	56-73	53-61
19	67	Residences at Spring Garden Apartments	53-70	54-72	54-72
20	67	Residences on Avery Park Court	60-60	62-62	63-64
21	67	Residences at Harmony Place Trailer Park on Pace Lane	52-70	54-71	57-65
22	67	Residences at Stony Brook Apartments on Buckman Road	54-55	55-56	57-58
23	67	Residences on Rolling Hills Avenue	57-70	58-72	58-63
24	67	Residences, pool at the Rolling Hills Apartments, and town home community on Roxbury Lane	44-65	45-67	46-68
25	67	Residences on Martha Street	50-70	51-71	53-73
26	67	Residences at Mount Vernon Apartments on Russell Road	49-55	50-56	50-57
27	67	Residences on Gregory Drive and Main Street	52-56	53-58	54-58
28	67	Buckman Road KinderCare facility	59	60	62
29	67	Residences at multi-story apartment building at Pole Road and Buckman Road	54	56	58
30	67	Residences at Pembroke Village condominiums on Pembroke Drive	58	59	59
31	67	Residences at Pinewood South condominiums on Buckman Road	48-65	49-66	50-66



CNE <sup>1</sup> ID	NAC $L_{eq}(h)^2$	Area Land Use and Description	Range of Predicted Worst-Hour $L_{eq}^3$ Exterior Noise Levels, dB(A) <sup>4</sup>		
			Existing 2016	No-Build 2045	Build 2045
32	67	Residences on Woodlawn Garden Apartments on Blankenship Street and Graves Street	38-66	39-68	40-69
33	67	Residences at Skyview Park town home community on Sky View Drive, Hallie Rose Street and Hallie Rose Place	42-54	43-56	46-57
34	67	Residences at Skyview Apartments, town homes on Towne Manor Court	42-64	44-65	44-68
35	67; 72	Residences on Highland Lane and Engleside Street, including a first-row commercial undeveloped parcel	51-68	53-69	53-70
37	72	Roy Rogers restaurant outside dining area	67	68	68
38	67	Pole Road Park	60	61	59

<sup>1</sup>Common Noise Environment

<sup>2</sup>Hourly Equivalent A-weighted Sound Level (dB(A))

<sup>3</sup>Equivalent Sound Level

<sup>4</sup>A-weighted, equivalent sound level in decibels

### 3.7.2 Environmental Consequences

Noise barrier analyses are warranted for all common noise environments (CNEs) with noise impacts. Noise barriers were not studied at impacted CNEs 7, 10, 24 and 25 due to excessive access constraints. Noise barriers determined to be physically feasible were evaluated at heights of 15, 20, 25 and 30 feet to assess whether they meet acoustic feasibility, design goal, and reasonableness criteria.

Potential noise barriers were determined to be feasible and reasonable at CNEs 3, 13, 19, 32 and 34. Noise barriers that are shown to be feasible and reasonable in the preliminary design may not be feasible and reasonable in final design. All noise barriers would be further evaluated in final design to determine any engineering constraints associated with constructing the noise barrier.

**Table 3-16** summarizes each barrier's feasibility, acoustical design details, benefited receptors, length, height, surface area, surface area per benefited receptor, and cost-reasonableness, where applicable.

**Table 3-16: Summary of Barrier Characteristics**

Barrier ID	CNE ID <sup>1</sup>	Barrier Length	Barrier Height	Surface Area (Square Feet)	Feasible?	Meets Design Goals?	Total Benefits	Barrier Square Feet per Benefited Receptor	Reasonable? (Square Feet per Benefit <1600)
1P	03	325	15	4,875	Yes	Yes	6	813	Yes
2P	06	576	30	17,280	No <sup>2</sup>	n / a	n / a	n / a	n / a
3P	07	Not studied due to access limits			No	n / a	n / a	n / a	n / a
4P	09	354	30	10,620	Yes	No <sup>3</sup>	n / a	n / a	n / a
5P	10	Not studied due to access limits			No	n / a	n / a	n / a	n / a
6P	13	351	15	5,265	Yes	Yes	40	132	Yes

Barrier ID	CNE ID <sup>1</sup>	Barrier Length	Barrier Height	Surface Area (Square Feet)	Feasible?	Meets Design Goals?	Total Benefits	Barrier Square Feet per Benefited Receptor	Reasonable? (Square Feet per Benefit <1600)
7P	19	333	25	8,325	Yes	Yes	18	463	Yes
8P	24	Not studied due to access limits			No	n / a	n / a	n / a	n / a
9P	25	Not studied due to access limits			No	n / a	n / a	n / a	n / a
10P	31	216	30	6,480	No <sup>2</sup>	n / a	n / a	n / a	n / a
11P	32	755	20	15,100	Yes	Yes	39	387	Yes
12P	34	249	15	3,735	Yes	Yes	13	287	Yes

<sup>1</sup>Common Noise Environment Identification Number

<sup>2</sup> Less than 50% impacted residences benefited.

<sup>3</sup> No impacted residences receive at least 7 dB(A) insertion loss

### 3.8 HAZARDOUS MATERIALS

Hazardous materials are substances that are defined and regulated by the USDOT in 49 CFR § 171.8 and § 172.101 (49 USC § 5103). Regulations regarding hazardous materials issues with respect to right-of-way acquisition for highway construction are found in 40 CFR § 312. Hazardous wastes are regulated by the USEPA and defined in 40 CFR § 261. Materials are considered hazardous if they are specifically listed by regulations, exhibit hazardous characteristics, or are universal (e.g. batteries, pesticides, mercury-containing equipment) or mixed wastes. Concerns associated with these materials include health risks, environmental damages, liability issues, potentially high costs of clean-up, and project delay. Hazardous materials sites can include gas stations, industrial sites, businesses that use hazardous materials in commercial operations, aboveground and underground storage tanks, disposal sites, spill sites, and others. The above listed agencies and VDEQ maintain databases of regulated sites and facilities. The *Hazardous Materials Assessment Technical Report (VDOT, 2017f)* contains an itemized listing of all known hazardous materials sites within the Study Area.

#### 3.8.1 Methodology

The Hazardous Materials Assessment (HMA) investigation area covers parcels within a radius of approximately 1-mile surrounding Richmond Highway through the Study Area. Information was obtained from regulatory database searches (including a database search conducted by Environmental Data Resources, Inc.), site reconnaissance, available published information, and local and state government officials. The assessment identified potential sites of concern for facilities that may have generated, used, stored, or disposed of petroleum products or potentially hazardous materials. Each listed site was assessed for its potential hazardous-material risk to the Richmond Highway corridor based on the nature of the contamination, topographic location relative to the corridor, proximity to the proposed project LOD, current or historical site activities and the potential for contaminants or hazardous materials associated with these activities to be mobilized during project construction. This HMA did not include subsurface or other invasive assessments, or business environmental risk evaluations.

### 3.8.2 Existing Conditions

The Study Area has primarily commercial land use with some residential properties. Land use adjacent to Richmond Highway in the Study Area includes former and / or existing petroleum retail facilities and dry cleaners with the potential for soil or groundwater contamination.

Federal and state environmental data bases identified 644 property parcels within the 1-mile search radius. Of those properties, 61 sites were given a priority ranking associated with the potential risk for mobilizing hazardous or contaminated substances before, during and after project construction.

### 3.8.3 Environmental Consequences

#### **No-Build Alternative**

The No-Build Alternative would not directly impact any hazardous materials.

#### **Build Alternative**

Contaminants from 19 properties with high to moderate contaminant risks could migrate into the Build Alternative LOD. These sites represent a risk of potential contaminant impacts that could migrate from the parcel and intersect the project LOD during excavation or significant subsurface construction.

Prior to acquisition of right-of-way and construction, a Phase I Environmental Site Assessment (ESA) as defined by the American Society of Testing and Materials (ASTM) Method E1527-13 should be conducted. Based on proposed construction and findings from the phase I ESA, an ASTM Phase II should be performed on those properties with high or moderate risks. Sites that are identified to include potential contamination should be assessed on a site-by-site basis to determine applicable measures prior to design, acquisition and / or construction. Undocumented hazardous materials that are encountered during construction efforts shall be managed, handled and disposed of in accordance with federal, state and local regulations.

## 3.9 INDIRECT AND CUMULATIVE EFFECTS

### 3.9.1 Indirect Effects

According to the CEQ, indirect effects are “...effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable” (40 CFR 1508.8(b)). Indirect effects may include “growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8(b)). For the purposes of the EA, the methodology followed for analyzing indirect effects is prescribed in the National Cooperative Highway Research Program (NCHRP) Report 466, *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (TRB, 2002). The indirect effects analysis relies on planning judgment that is described in the NCHRP 25-25 program, Task 22, *Forecasting Indirect Land Use Effects on Transportation Projects* (TRB, 2007), and North Carolina Department of Transportation’s (NCDOT) Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina (NCDOT, 2001). Refer to the *Indirect and Cumulative Effects Technical Report* for a more detailed discussion of the methodology for analysis of indirect effects (VDOT, 2017g).

#### **No-Build Alternative**

Under the No-Build Alternative, increased traffic delays, congestion, and the lack of improved bicycle and pedestrian access would have an adverse indirect effect on community facilities, businesses, and

residents. Additional proximity effects such as noise, air quality, and visual intrusions are expected as a result of the increased congestion along the existing roadway network. Increased traffic on the roadway from future area growth could affect communities, businesses, and the population that lives along or that uses the roadway, potentially causing residential and business relocations away from traffic congestion and associated air and noise impacts. Potential natural resources indirect effects could be associated with petroleum spills and leaks from vehicles and salt or chemicals due to maintenance activities, and animal-vehicle collisions. Increased traffic delays would negatively affect the accessibility to the identified historic resources.

No induced growth would be expected as a result of the No-Build Alternative. The Indirect and Cumulative Effects (ICE) Study Areas and surrounding locality is already highly developed and built-out with mature infrastructure.

### **Build Alternative**

A majority of the relocations and right-of-way acquisitions would be located on the edge of the study communities. Therefore, indirect relocation effects to communities and community cohesion should be limited under the Build Alternative. Additionally, at least one access would be provided per community facility within the access management LOD and no adverse effects to the function of these facilities would occur. By improving an existing highway rather than building on new alignment, impacts to community facilities would be minimized with little indirect effects to community cohesion. Because the direct residential relocations would be relatively low (17 housing units), no indirect long-term effects to population and housing in the ICE Study Areas would occur. The Build Alternative would have minor indirect effects to communities and community facilities in the ICE Study Areas.

Improvements to the existing Richmond Highway are anticipated to improve travel time and reliability in the ICE Study Areas which would indirectly benefit businesses and commuters. The increased travel reliability for delivery of and access to goods and services could result in gained economic productivity.

Indirect effects to communities, community facilities, bike paths and recreational resources, and economics from the Build Alternative are also expected to be minor during construction. Construction could cause temporary noise impacts, temporary road closures, and detours that could potentially increase commute times, travel time to community facilities, and emergency vehicle response times. However, the Build Alternative would have long-term beneficial effects such as reduced travel time, increased travel reliability, a reduced rate of bicycle / pedestrian and motor vehicle crashes, an increase in bicycle and pedestrian network usage, and a shift in community transportation mode choice from motor vehicle to bicycle and pedestrian passage between communities, residents, neighborhoods and businesses.

Potential indirect long- and short-term effects to waters, wetlands, and water quality could result from increased stormwater runoff due to increases in impervious surfaces and/or temporary effects from in-stream work and earth disturbance during construction. Implementation of strict erosion and sediment control and stormwater measures during construction would minimize permanent and temporary impacts to waters, wetlands and water quality, and thereby minimize indirect effects as well. Potential indirect effects to floodplains could occur if fill is placed into floodplains, changing the flood flow elevations. All construction activities would be designed to ensure that culverts, bridges and pedestrian underpasses at Dogue Creek and Little Hunting Creek are adequately sized and do not impede floodwater passage. The Build Alternative is not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life.

Indirect effects to wildlife and threatened, endangered, and special status species could be related to increased noise; potential for animal-vehicle collisions, oil spills, and for introduction of invasive species; changes in vegetative composition due to changes in light and hydrologic regimes; and loss of habitat. New and expanded fragmentation to wildlife habitat could be an additional indirect effect, however, since the Build Alternative would be on an existing alignment, habitat and wildlife corridor fragmentation is expected to be minimized. Existing culvert and bridge crossings would allow for the continued passage of terrestrial and aquatic wildlife beneath Richmond Highway. The proposed replacement of the existing Dogue Creek short span bridge with a longer, higher bridge would allow for continued wildlife movement, aiding aquatic and terrestrial organism passage beneath the road. Other design and BMP measures would be used at North Fork Dogue Creek, and Little Hunting Creek during and after construction to minimize indirect impacts to anadromous fish and other aquatic wildlife. During construction, the contractor would adhere to VDOT's Road and Bridge Specifications manual, Chapter 40 of Title 3.2 of the Code of Virginia, 2VAC-5-390-20, and other applicable regulations to prevent the introduction and establishment of invasive species.

The Build Alternative would directly affect one historic resource (the OMOVHS) and indirectly affect the viewshed of two historic resources (the Woodlawn Plantation and the Sharpe Stable Complex) and one historic district (Woodlawn Cultural Landscape Historic District). Through coordination with VDHR, to recognize the importance of the OMOVHS to the county and local community and minimize direct effects to the OMOVHS, VDOT proposes to install two interpretive signs on the property highlighting the architectural and historic education context of the campus. VDOT also commits to working with Fairfax County to conduct an oral history project for the OMOVHS that can be disseminated to the public. No mitigation is proposed for the indirect effects on the historic properties and district.

The ICE Study Areas and surrounding locality are built-out with mature infrastructure. Review of aerial photography shows that more than 90 percent of the area within 1 mile of the direct effects Study Area is developed or undevelopable (see the ICE Technical Report, Appendix B.) Since the Build Alternative would not contribute to any conditions conducive to induced growth including transportation on new alignment, new interchanges, land use progression, or largely new infrastructure or economic advances that are not already planned in the ICE Study Areas, no induced growth would be expected as a result of the Build Alternative.

### 3.9.2 Cumulative Effects

CEQ defines cumulative effects (or impacts) as "...the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). Cumulative effects include the total of all impacts, direct and indirect, experienced by a particular resource that have occurred, are occurring, and / or would likely occur as a result of any action or influence, including effects of a federal activity (USEPA, 1999). The cumulative effects analysis is based on the five-part evaluation process outlined in *Fritiofson v. Alexander*, 772 dF.2d 1225 (5th Cir. 1985), as described in FHWA's *Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* (FHWA, 2014):

1. What is the geographic area affected by the study?
2. What are the resources affected by the study?
3. What are the other past, present, and reasonably foreseeable actions that have impacted these resources?



4. What are those impacts?
5. What is the overall impact on these various resources from the accumulation of the actions?

Following is a summary of this evaluation. Refer to the *Indirect and Cumulative Effects Technical Report* for a more detailed discussion of each step of the evaluation (VDOT, 2017g).

The ICE Study Area has been in a progression of development since the early 1900s, being fully developed in the 1970s, in part due to the adjacency of the area to Washington, D.C. The potential for future development is largely limited to redevelopment or infill development due to lack of vacant land within the ICE Study Area. Past and present actions have been both beneficial and adverse to socioeconomic resources, and it is expected that reasonably foreseeable future actions could be as well. Past and present growth and development has increased the standards of living for communities, provided for community cohesion, as well as community facilities and recreational resources. Such growth and development have benefited local economies by improving access to markets and customers. Some past and present development actions have resulted in large-scale residential, community facility, and business relocations that adversely affected community cohesion. Transportation facilities have divided and isolated communities, reducing access to neighbors and services.

Historically, conversion of natural areas to developed land has had the greatest impact on the area, with much of this conversion occurring without the benefit of modern stormwater management facilities and / or water quality regulations. This development has helped lead to the degradation and / or loss of natural resources over time. Past actions also resulted in the loss and fragmentation of much of the terrestrial wildlife habitat in the ICE Study Area. Refer to the *Indirect and Cumulative Effects Technical Report* for a more detailed discussion of the historic land use of the area and for historic topographic maps (VDOT, 2017g). Present and reasonably foreseeable future actions include protections to wetlands, floodplains, water quality, and threatened, endangered, and special status species afforded by federal, state, and local regulations. These protections could limit future adverse impacts to natural resources. Additionally, local comprehensive planning includes natural resource management plans that aim to preserve remaining high valued wildlife habitat and water quality by directing growth to specific areas and densities, with the goal of sustaining natural resources for the future.

Damage or loss of historic resources was far more prevalent from actions that occurred prior to the NHPA of 1966. The NHPA of 1966 combined with the establishment of historic resource protection objectives established at the local planning level, have reduced the rates of impacts to historic resources. However, conflicts between the protection of historic properties and development and transportation continue to occur.

#### **No-Build Alternative**

The No-Build Alternative would not improve the existing Richmond Highway corridor. Future growth in the region would increase traffic on the roadway and could affect communities, businesses, and the population that lives along or that uses the roadway, potentially causing residential and business relocations away from traffic congestion and associated air and noise impacts. Additionally, no induced growth would be expected as a direct or cumulative result of the No-Build Alternative.

Since its initial construction, Richmond Highway has undergone many improvements and widenings, which have included updating associated stormwater facilities. However, there are still sections lacking any stormwater management features, in addition to sections with outdated features which would not be improved under the No-Build Alternative. Existing untreated or poorly treated stormwater runoff would continue.

Under the No-Build Alternative, increased traffic delays would negatively affect the accessibility to the identified historic resources.

### **Build Alternative**

The Build Alternative would decrease congestion, increase safety, and provide enhanced bicycle and pedestrian facilities. The Build Alternative would result in a beneficial cumulative effect, with beneficial impacts on local communities, community facilities, bike paths and recreational areas, and economics. The short-term impact of more jobs and associated expenditures resulting during construction of the Build Alternative could benefit the local communities and businesses. Once complete, the project is not anticipated to create induced growth or infill development beyond what was anticipated without the project.

The Build Alternative's impacts to waters, wetlands, and water quality; floodplains, wildlife habitat; and threatened, endangered, and special status species would contribute to the cumulative effects that have occurred in the past to natural resources within the study area; although the effects should be minimized by implementation of best management practices and compensatory mitigation. Construction and post-construction of the Build Alternative would potentially contribute to minor, localized increases in pollutants and nutrients causing impairment to waterways. Since construction of the Build Alternative would upgrade and replace current stormwater management systems, implementation of the Build Alternative could improve roadway runoff water quality from current conditions.

Prior to the NHPA and local protective measures, the impact to historic resources through the development of the area was much higher than the potential impacts today. Some historic properties (private and public) may continue to fall into disrepair or be impacted by development in the area. On federal undertakings, implementation of mitigation strategies would be coordinated with VDHR and Section 106 consulting parties (as necessary), reducing cumulative impacts on historic resources that would otherwise occur.

In summary, past and present actions have impacted the current state of socioeconomic, natural, and historic resources within the associated ICE Study Areas, and future actions would continue to affect these resources irrespective of this project. However, since the region is already highly developed, cumulative effects of the Build Alternative are expected to be minimal. Additionally, current regulatory requirements and planning practices are helping to avoid or minimize the contribution of present and future actions to adverse cumulative effects for socioeconomic, natural, and historic resources. For additional information, refer to the *Indirect and Cumulative Effects Technical Report* (VDOT, 2017g).

## **3.10 SECTION 4(F)**

### **3.10.1 Existing Conditions**

Under provisions of Section 4(f) of the USDOT Act of 1966 (49 USC § 303(c)), the FHWA may approve the use of land from publicly owned public parks or recreation areas, publicly owned wildlife or waterfowl refuges, or historic sites that are listed in, or eligible for listing in, the NRHP for federal-aid highway projects if it determines that there is no feasible and prudent avoidance alternative and the action includes all possible planning to minimize harm to the property. FHWA also may approve the use of land from such properties if it determines that the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a *de minimis* impact, as defined in 23 CFR § 774.17, on the property. A "use" of Section 4(f) property occurs:

1. When land is permanently incorporated into a transportation facility;
2. When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or,
3. When there is a constructive use of a Section 4(f) property.

Existing public parks, recreational areas, wildlife and waterfowl refuges, and public and private historic properties were identified through a review of locality planning documents as well as available mapping, aerial photography, agency data, and GIS data.

### 3.10.2 Environmental Consequences

#### **No-Build Alternative**

No impacts to identified Section 4(f) resources within the Study Area are expected under the No-Build Alternative.

#### **Build Alternative**

A total of seven Section 4(f) resources are within the Study Area. **Table 3-17** presents characteristics of park and recreation Section 4(f) resources in the Study Area, and **Table 3-18** presents historic property Section 4(f) resources. No wildlife or waterfowl refuges are present in the Study Area.

**Table 3-17: Park and Recreation Section 4(f) Resources in the Study Area**

Section 4(f) Resource	Function of the Resource	Amenities	Acres Within Study Area	Anticipated Section 4(f) Use / Finding
Pole Road Park	Park	2 Tennis courts, Playing Greens, Natural Area	0.1	No Use
Vernon Heights Park	Park	Trail, Natural Area	<0.01	No Use
Little Hunting Creek Park	Park	Stream Valley Park, Natural Area, Watershed	0.2	No Use

**Table 3-18: Historic Property Section 4(f) Resources in the Study Area**

Property	VDHR Number	Description	NRHP Eligibility	Anticipated Section 4(f) Use / Finding
Original Mount Vernon High School (OMVHS)	029-0230	1939 Colonial Revival Former High School	NRHP Listed	<i>De Minimis</i>

Property	VDHR Number	Description	NRHP Eligibility	Anticipated Section 4(f) Use / Finding
Woodlawn Plantation	029-0056	Circa 1800 plantation	National Historic Landmark, NRHP Listed, Contributing to Woodlawn Cultural Landscape District	No Use
Woodlawn Cultural Landscape Historic District	029-5181	Rural cultural landscape associated with Woodlawn Plantation and George Washington's Mount Vernon (1799-1964)	Potentially NRHP Eligible (considered by VDOT to be eligible for the NRHP for the purposes of Section 106 for this project)	No Use
Sharpe Stable Complex	029-5181-0005	Circa 1913-1997 bank barn, riding rink, and paddocks	Individually Potentially NRHP Eligible, Contributing to Woodlawn Cultural Landscape District	No Use

No Section 4(f) use would occur under the Build Alternative at the three parks in the Study Area as no permanent or temporary right-of-way would be acquired and no constructive use would occur. The park areas near the Build Alternative are already situated next to the existing Richmond Highway. Noise impacts of the Build Alternative would not be substantially different than existing conditions near the three parks nor the modeled 2045 No-Build scenario (see the *Noise Analysis Technical Report [VDOT, 2017e]*). Modeled noise at the three parks under the Build Alternative is well below the FHWA noise abatement criteria for Activity Category C receptors. The visual setting of the three parks near Richmond Highway would not be substantially different than existing conditions

The Build Alternative would not require permanent nor temporary right-of-way from Woodlawn Plantation, Woodlawn Cultural Landscape Historic District, or the Sharpe Stable Complex. However, there would be a change in the views from portions of these historic properties toward the southern terminus

of the Build Alternative. This change would not diminish any aspects of integrity as the historic setting and feeling have been previously diminished by the widening of Jeff Todd Way and the Mount Vernon Memorial Highway in 2013 to 2014, and the recent widening and realignment of Richmond Highway south of the Mount Vernon Memorial Highway (VA 235) / Jeff Todd Way intersection. Thus, no constructive use would occur. The Department of Historic Resources has concurred no adverse effect from the Build Alternative would occur to these historic properties (see **Appendix C: Agency Coordination**).

Under the regulations implementing Section 4(f) 23 CFR § 774.17, FHWA intends to make a *de minimis* impact finding with respect to the Build Alternative Section 4(f) involvement with the OMVHS historic property. The Build Alternative would acquire approximately 0.57 acres of right-of-way along the frontage of the OMVHS facing Richmond Highway, within the circular drive and parking area of the property. This area of the school grounds has been modified over time and has lost physical integrity such that its setting and feeling have been diminished and no longer conveys its historic significance. However, VDOT recognizes the importance of the OMVHS to the County and local community and proposes to install two interpretive signs on the property highlighting the architectural and historic education context of the campus. VDOT also commits to working with Fairfax County to conduct an oral history project for the OMVHS that can be disseminated to the public. Provided VDOT fulfills these commitments to install interpretive signage on the property and to conduct an oral history project, the Build Alternative would affect this historic property, but the effect would not be adverse. The Department of Historic Resources has concurred with this finding as has Fairfax County, the property owner (see **Appendix C: Agency Coordination**). The public will be given opportunity at the public hearing to review and comment on the proposed Build Alternative and the proposed *de minimis* finding.



## 4. COORDINATION AND COMMENTS

The DRPT Multimodal Study conducted to identify the purpose and need and preliminary alternatives for the Richmond Highway corridor included comprehensive public and stakeholder outreach consisting of three public meetings, information booths at corridor events, attending business association and neighborhood meetings, newsletters, press releases, a project website and social media.

Additional project input and guidance to the Multimodal Study was provided by:

- A Community Involvement Committee composed of business and community leaders and interested organizations. The committee met quarterly and provided guidance to the project team.
- An Executive Steering Committee, consisting of elected officials and senior agency staff, to assist with policy-related decision making and funding strategies. This committee met quarterly and provided strategic guidance throughout the study.
- A Technical Advisory Committee consisting of state and local agency staff with expertise in a range of relevant topic areas. This committee met quarterly and provided technical guidance on the work products.

The public involvement process for the Richmond Highway Corridor Improvements Project began on April 8, 2016 with the scoping period. During this time, the project team developed the Study Area boundary, as well as the project purpose and need, and preliminary environmental resources for evaluation. This information was developed through coordination with government agencies, community organizations, and other stakeholders, as well as reviews of the *Fairfax County Comprehensive Plan*, *Fairfax County Bicycle Master Plan*, and other local planning documents.

### 4.1 AGENCY COORDINATION

#### 4.1.1 Agency Scoping Responses

VDOT began coordination with federal, state, and local government agencies via letters mailed on April 8, 2016. The letters formally announced the initiation of the Richmond Highway Corridor Improvements Project EA and provided a brief overview of the project. An attached questionnaire encouraged recipients to provide input on issues and resources related to the project. A second, identical round of letters and questionnaires were mailed on June 6, 2016 to government agencies that did not initially respond.

The letters and questionnaires were mailed to the following government agencies:

- |   |  |
|---|--|
| • Commonwealth Transportation Board,<br>Northern Virginia District        | • Fairfax County Department of<br>Transportation   |
| • Fairfax County Department of Housing<br>and Community Development       | • Fairfax County Economic Development<br>Authority |
| • Fairfax County Department of<br>Neighborhood and Community Services     | • Fairfax County Office of Executive<br>Department |
| • Fairfax County Department of Planning<br>and Zoning                     | • Fairfax County Fire and Rescue<br>Department     |
| • Fairfax County Department of Public<br>Works and Environmental Services | • Fairfax County Health Department                 |
|   | • Fairfax County Park Authority                    |
|   | • Fairfax County Planning Commission               |
|   | • Fairfax County Police Department                 |

- Fairfax County Public Schools
- Fairfax County Water Authority
- Federal Highway Administration, Eastern Federal Lands Highway Division
- Federal Highway Administration, Virginia
- Metropolitan Washington Council of Governments
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Habitat Conservation Division
- Northern Virginia Regional Commission
- Northern Virginia Regional Park Authority
- Southeast Fairfax Development Corporation
- The Historical Society of Fairfax County
- United States Army Corps of Engineers, Norfolk District
- United States Department of Agriculture, Natural Resources Conservation Service
- United States Department of Housing and Urban Development, Richmond Field Office
- United States Department of the Interior, Fish and Wildlife Service
- United States Department of the Interior, National Park Service
- United States Department of the Interior, Office of Environmental Policy and Compliance
- United States Environmental Protection Agency
- US Army Garrison, Fort Belvoir, Directorate of Public Works
- US Department of Homeland Security, Federal Emergency Management Agency
- US Department of Transportation, Federal Transit Administration
- Virginia Department of Agriculture and Consumer Services
- Virginia Department of Conservation and Recreation
- Virginia Department of Environmental Quality, Environmental Impact Review
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Health
- Virginia Department of Historic Resources
- Virginia Department of Housing and Community Development
- Virginia Department of Mines, Minerals and Energy
- Virginia Marine Resources Commission
- Virginia Outdoors Foundation
- Washington Metro Area Transit Authority

Several government agencies responded to the scoping letter and questionnaires (**Appendix C**). In their responses, agencies urged minimization of potential impacts to various natural, recreational, historic, community, and utility resources in the Study Area. Agencies also requested continued coordination throughout project development. Agency scoping responses can be found in **Appendix C**.

## **4.2 PUBLIC INVOLVEMENT**

### **4.2.1 Public Scoping Responses**

The public scoping of the project occurred at the same time as government agency notification. Letters and questionnaires were mailed on April 8, 2016 to the following community organizations, in addition to 806 property owners within one-quarter mile of the project:

- Alexandria Miracle International Church
- Emmanuel Baptist Church
- Engleside Post Office
- Fairfax County Board of Supervisors, Mount Vernon District
- Fairfax County Health Service, Mount Vernon District Office
- Favor House Ministries
- Fire Station 24, Woodlawn
- Inova Mount Vernon Hospital
- Islamic Saudi Academy
- Kingstowne Library
- Lorton Urgent Care
- Mount Vernon Apartments
- Mount Vernon Church of Christ
- Mount Vernon Civic Association
- Mount Vernon Council of Citizens Associations
- Mount Vernon Country Club
- Mount Vernon District Police Station
- Mount Vernon High School
- Mount Vernon Ladies' Association
- Mount Vernon Manor
- Mount Vernon Manor Citizens Association
- National Trust for Historic Preservation
- Pole Road, Fairfax County Park
- Rising Hope United Methodist Mission Church
- Sacramento Neighborhood Center
- Sherwood Regional Library
- South County Health Center
- Spirit of Faith Ministries
- Stony Brook Apartments
- The Hideaway Teen Center
- Washington Community Church
- Washington Mill Elementary School
- Wesley United Methodist Church
- Whitman Middle School

Several community organizations and property owners responded to the scoping letters and questionnaires. Common concerns from their responses included Study Area travel times; the project schedule; inclusion of Spanish-speaking residents in the EA process; continued public coordination; and potential natural resource, property, socioeconomic, Environmental Justice, and temporary construction impacts.

### **4.2.2 Public Information Meeting**

Four Public Information Meetings (PIM) were held to provide an opportunity for anyone to learn about the project and provide comments. **Table 4-1** presents the meeting dates and locations.

**Table 4-1: Public Information Meetings**

Meeting Number	Date and Time	Location
PIM 1	Tuesday, April 18, 2017 6:30 pm to 8:30 pm	Mt. Vernon High School 8515 Old Mt. Vernon Road Alexandria, VA 22309
PIM 2	Monday, November 6, 2017 6:30 pm to 8:30 pm	Mt. Vernon High School 8515 Old Mt. Vernon Road Alexandria, VA 22309
PIM 3	Wednesday, April 4, 2018 6:30 pm to 8:30 pm	Mt. Vernon High School 8515 Old Mt. Vernon Road Alexandria, VA 22309
PIM 4	Monday, October 29, 2018 6:30 pm to 8:30 pm	Mt. Vernon High School 8515 Old Mt. Vernon Road Alexandria, VA 22309

Pursuant to federal and state regulatory requirements and in accordance with VDOT’s Policy Manual for Public Participation in Transportation Projects (VDOT, 2016d), meetings were advertised in local newspapers, on the Project website, and via press releases. Project display boards, informational handouts and comment sheets were available at the meetings and posted on the Project website. During each meeting, VDOT representatives were available to discuss the project and explain display boards. Spanish-speaking interpreters were present at all meetings. Approximately 202 persons attended PIM 1 and 55 commenters submitted comments during the 30-day comment period after the meeting. Nearly 200 persons attended PIM 2 and 61 commenters submitted comments during the 30-day comment period after the meeting. Approximately 160 persons attended PIM 3 and 23 individual comments were submitted to VDOT.

#### **4.2.3 EA Public Hearing / PIM 4**

The EA was circulated for public comment between October 23, 2018 and December 6, 2018. Following initial circulation of the EA, VDOT held a combined Public Hearing for the EA and PIM 4 for preliminary design for this project on October 29, 2018 at Mount Vernon High School, 8515 Old Mount Vernon Road, Alexandria, Virginia from 6:00 to 9:00 pm. The purpose of the hearing was to present the findings of the EA, provide a discussion forum between the public and the project team, and obtain input and comments from the community. Pursuant to federal and state regulatory requirements and in accordance with VDOT’s Policy Manual for Public Participation in Transportation Projects (VDOT, 2018), the public was notified of the hearing via local newspaper advertisements, email notices, press releases and the VDOT website.

Approximately 225 persons attended the EA Public Hearing / PIM 4 and 69 comments were submitted during the comment period after the meeting. Issues were identified from multiple comments and summarized in **Appendix A** along with responses to comments. Most comments (98) were concerned with the following issues:

- Stormwater management
- Compensatory wetland/stream and floodplain mitigation
- Bridge crossings and wildlife corridors
- Floodplain impacts at bridge crossings
- Chesapeake Bay Preservation Act Resource Protection Areas and Fairfax County Environmental Quality Corridors
- Bicycle/pedestrian access
- Anadromous fish
- Trash management
- Historic Huntley viewshed
- Noise wall design and impacts
- Cultural resources
- Landscaping with native plants
- Interpretive signing/scenic vistas
- Stormwater management facilities coordination with the BRT project
- Air quality
- Utilities
- Climate change/resiliency

Additional individual substantive comments (58) were also received and are addressed in **Appendix A: Comment Responses**. All comments received during the EA Public Hearing and during the public comment period have been considered and incorporated into the study record and Revised EA, as applicable.

#### 4.2.4 Community Meetings

VDOT has maintained all efforts to provide transparency for the public and to address public concerns throughout the project process. These efforts include 28 community meetings (**Table 4-2**) since February 2018 that addressed concerns regarding right-of-way acquisition procedure, pedestrian underpasses, property frontage impacts, safety concerns, candidate stormwater management pond locations, noise barriers, bridge replacements, and environmental impacts.

**Table 4-2: Community Meetings**

Meeting Name	Date
Fairfax County Police and Fire & Rescue Meeting	Thursday, February 15, 2018
Public Information Session #1	Tuesday, May 1, 2018
Public Information Session #2	Wednesday, May 9, 2018
Public Information Session # 3	Tuesday, May 15, 2018
Public Information Session #4	Saturday, May 19, 2018
Spring Garden Apartments Association Meeting	Friday, September 7, 2018
Meeting with James Bacon	Tuesday, November 6, 2018
Mount Zephyr Homeowners Association Meeting	Tuesday, November 27, 2018
Kyriacou Family and Supervisor McKay Meeting	Thursday, December 6, 2018



Meeting Name	Date
American Legion Post 177 Meeting	Monday, December 10, 2018
Transportation Town Hall Meeting	Thursday, December 13, 2018
Mount Vernon Council of Civic Associations Meeting	Monday, January 7, 2019
South County Government Center Meeting	Monday, January 7, 2019
Fairfax County Police and Fire & Rescue Meeting	Friday, February 1, 2019
Mount Vernon-Lee Chamber of Commerce Meeting	Thursday, February 14, 2019
Spring Garden Apartments Community Meeting	Friday, March 1, 2019
Fairfax County Supervisors Briefing	Tuesday, March 12, 2019
Design Public Hearing	Tuesday, March 26, 2019
Talbott Farms Homeowners Association	Saturday, March 30, 2019
Wyngate Manor Project Briefing Meeting	Tuesday, May 14, 2019
New Gum Springs Civic Association Meeting	Tuesday, June 11, 2019
Ourisman Meeting	Monday, June 24, 2019
Adult Day Health Center Meeting	Tuesday, June 25, 2019
Pinewood South Condominium Owners Association Meeting	Thursday, June 27, 2019
Mount Vernon-Lee Chamber of Commerce Meeting	Thursday, November 21, 2019
8501 Richmond Highway Meeting	Wednesday, February 5, 2020
Harmony Place Trailer Park Meeting – presented in Spanish	Thursday, February 6, 2020
Bestway Meeting with Mr. Choi	Wednesday, March 3, 2020

VDOT held four targeted Public Information Sessions in May of 2018 to provide personalized interactions with all residents, property owners and property managers located within the project limits. They were invited to review the preferred design alternative, learn about the right-of-way process and discuss their questions with members of the project team. The primary focus of these meetings was for Right-of-Way Staff to speak one on one with the community in a smaller session.

To ensure the Spanish speaking residents who reside within the project area were properly notified of the potential project impacts, VDOT held a special presentation on Thursday, February 6, 2020 at Good Shephard Catholic Church, in Alexandria, VA. All meeting materials and the entire presentation were in Spanish, along with a comprehensive question and answer session. Multiple interpreters were available and fully engaged the attendees, allowing for an open discussion. VDOT has ensured the community outreach has been thorough, and all meeting materials have been uploaded to the project website on or prior to all meetings. VDOT intends to maintain this level of public engagement to keep the public informed of the project status.

### **4.3 ADDITIONAL COORDINATION EFFORTS**

In addition to the coordination previously discussed, numerous other meetings and coordination efforts were conducted with federal, state, and local agencies throughout the EA process including:

- Coordination with Fairfax County DOT and *Embark Richmond Highway*
- Agency Partnering meetings
- Coordination with the VDHR
- Coordination with USACE
- Coordination with USFWS
- Coordination with DEQ

#### **4.3.1 Mailing List**

A Project mailing list composed of property owners within the Study Area was developed, and property entry letters were mailed pursuant to § 33.1-94 of the Code of Virginia. VDOT mailed property owners within the Study Area a letter on July 8, 2016 and December 15, 2016, stating that an agent of VDOT may need to access their property to perform environmental resource surveys; investigate potential environmental impacts; and conduct all testing and sampling, including, but not limited to shovel tests, soil samples, and borings. The letters included contact information for the VDOT NOVA District Environmental Contact, should letter recipients have questions or concerns.

#### **4.3.2 Website**

Information for the Project, including the EA, the Revised EA, and all technical documentation, is available to the public through the following VDOT website:

[http://www.virginiadot.org/projects/northernvirginia/richmond\\_highway.asp](http://www.virginiadot.org/projects/northernvirginia/richmond_highway.asp)

As the Project progresses, meeting information and materials will be posted, including comment forms for the public to provide feedback throughout the EA study.

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## **Appendix A: Comment Responses**

**RESPONSES TO COMMENTS RECEIVED**

The Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT), prepared a Revised Environmental Assessment (EA), pursuant to 23 CFR §771.119, to evaluate the potential social, economic, and environmental effects associated with improvements along an approximately 2.9-mile section of Richmond Highway between Route 235 (Mount Vernon Memorial Highway – South) to 0.07 miles north of Route 235 (Mount Vernon Highway – North) at Napper Road. In October 2018, the EA was approved for public availability, followed by a comment period, during which input and feedback from interested stakeholders were provided via written letters, email, online comment forum, or verbal testimony. The stakeholders included individuals, special interest groups, government and regulatory agencies, non-profit organizations, community organizations, and commercial entities.

The EA Public Hearing combined Public Information Meeting (PIM) 4 took place at Mt. Vernon High School. There were approximately 225 attendees, including local elected officials and representatives. This Public Hearing offered interested individuals an opportunity to review and discuss the EA and supporting materials, as well as provide input. The Public Hearing followed a traditional format, in which a verbal presentation and visual displays were provided to meeting attendees. Prior to and following the verbal presentation, graphic displays and a team of technical experts staffing the Public Hearing were available in an open house format for informal review and discussion to answer any questions from meeting attendees. Copies of the EA and the accompanying preliminary design plans for the Build Alternative that was evaluated in the EA were available at the Public Hearing. The public was notified of the Public Hearings via local newspaper advertisements, email notices, press releases, electronic newsletter, and the VDOT website. At the Public Hearing and throughout the comment period, the public was asked to provide verbal or written feedback on the project, which was intended to ensure informed decision making on advancing the project and the development of detailed project design. In December 2018, at the close of the comment period, a total of 69 commenters had provided feedback. Comments received have been grouped into common themes and summarized for the purposes of providing detailed responses. Comments included support or opposition to portions or all of the improvements evaluated in the EA, as well as questions regarding specific issues such as:

- Stormwater management
- Compensatory wetland/stream and floodplain mitigation
- Bridge crossings and wildlife corridors
- Floodplain impacts at bridge crossings
- Chesapeake Bay Preservation Act Resource Protection Areas and Fairfax County Environmental Quality Corridors
- Bicycle/pedestrian access
- Anadromous fish
- Trash management
- Historic Huntley viewshed
- Noise wall design and impacts
- Cultural resources
- Landscaping with native plants
- Interpretive signing/scenic vistas
- Stormwater management facilities coordination with the BRT project
- Air quality
- Utilities
- Climate change/resiliency



Additional comments were received from property owners concerning potential impacts to specific properties as well as number and configuration of turning lanes and similar design issues. As these comments concerned specific potential detailed design issues beyond the planning level design analysis completed for the purposes of NEPA, these comments are not individually addressed in the Revised EA but have been retained for consideration in advanced design.

Responses and the number of comments received on the EA are provided in **Table 1**. Each comment (98) has been subdivided into applicable themes (17). Representative responses have been developed for several of the recurring comment themes; however, individualized responses have been prepared for unique substantive comments (58) regarding other issues (**Table 2**).

Prepared in accordance with 23 CFR §771.119(g), this report is intended to assess and consider comments received on the EA as well as provide responses to inform the decision-making process for advancing the project. Comments were evaluated to determine if: modifications to alternatives or alternatives not previously considered should be evaluated; new information needed to be considered; analyses in the EA needed to be supplemented, improved, or modified; or information presented in the EA required technical correction.

**Table 1: Comments and Responses Summarized by Category**

Issue	Issue Description	Number of Comments	Response
<b>Stormwater Management</b>	Comments were received regarding the location and proposed impact of stormwater management facilities, the aesthetic design of stormwater facilities, compliance with Fairfax County ordinances regarding stormwater, and keeping stormwater flows separate between Dogue Creek and Little Hunting Creek watersheds.	12	Planning level design completed for NEPA is presented in the EA. Detailed stormwater design determining the type, location and size of improvements would be completed in more advanced design phases. VDOT is required by law to control and treat stormwater runoff from roadways. Each facility would meet federal, state and local regulations while taking into account the size of the area draining into the facility, the amount of pavement area the facility would treat, existing landscape and obstructions, soil conditions (infiltration capabilities and ground water elevations), underground utility impacts, wetlands, streams, parkland, and historic property impacts, and construction and future maintenance cost. Every effort would be made to not locate stormwater facilities in wetlands, RPA or EQC. VDOT would design stormwater management facilities that would keep stormwater flow separate between the Dogue Creek and Little Hunting Creek watersheds. VDOT would work with Fairfax County to minimize locating stormwater management facilities in planned areas of development and redevelopment such as designated Community Business Centers.
<b>Compensatory Wetland, Stream and Floodplain Mitigation</b>	Commenters requested compensatory mitigation to the streams and wetlands impacted by the project rather than through purchasing credits or in-lieu fees, and to include property acquisitions for habitat and floodplain restoration, with several requesting	11	As stated on page 3-28 of the EA, the Build Alternative would impact a total of 0.2 acre of wetlands and approximately 963 ft of Upper Perennial streams. VDOT and FHWA will consider and prioritize conceptual compensatory mitigation options for wetlands and streams consistent with the 2008 final joint USACE and EPA federal regulations titled Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (33 CFR Part 325 and 332; 40 CFR part 230). The rule emphasizes a watershed approach to compensatory mitigation and provides a preference hierarchy for particular compensatory mitigation measures, and flexibility for specific projects to offset environmental losses from unavoidable impacts to wetlands and streams. Compensatory mitigation measures would be developed in the permitting phase during final design. Page 3-33 of the EA indicated about 8.6 acres of 100-year floodplain would be impacted, based on

Issue	Issue Description	Number of Comments	Response
	private property at 8800 Richmond Highway along Dogue Creek be purchased, restored and donated to Fairfax County for long-term conservation.		the assumption the crossings would consist of roadway fill. More advanced design would study the feasibility of constructing bridges that span the floodplains, potentially reducing project encroachment on floodplains.
<b>Bridge Crossings and Wildlife Corridors</b>	VDOT should provide the widest area possible under bridges for wildlife crossings and ensure the bridge design provides for natural lighting below the bridge between the spans.	9	Comment noted. The specific design and mitigation measures that could benefit the terrestrial and aquatic wildlife health and movement would be determined in advanced design and permitting in consultation with regulatory agencies and Fairfax County.
<b>Floodplain Impacts at Bridge Crossings</b>	Commenters acknowledge the proposed project would restore natural floodplain functions with wider bridge crossings, especially at Dogue Creek and Little Hunting Creek, but are concerned downstream flooding could result. Commenters were concerned that a	8	Potential indirect and cumulative effects to floodplains are identified in the project Indirect and Cumulative Effects Technical Report on page 57. Efforts to minimize floodplain encroachment would be considered during advanced design to avoid or minimize impacts on natural and beneficial floodplain values. The potential impacts to floodplains from the alternatives are evaluated in the EA based on planning level design. The Build Alternative's water crossings would be designed consistent with procedures for the location and hydraulic design of highway encroachments on floodplains contained in 23 CFR § 650 Subpart A Location and Hydraulic Design of Encroachments on Flood Plains. In addition, the Build Alternative would be designed in accordance with Sections 107 Legal Responsibilities and 303 Earthwork of VDOT's Road and Bridge specifications. The Build Alternative is not expected to increase flood elevations, the probability of flooding, or the potential for property loss and hazard to life. Hydraulic studies

Issue	Issue Description	Number of Comments	Response
	hydraulic study be completed. Other comments requested bridge crossing and floodplain improvements outside the Richmond Highway (Route 1) Corridor Improvement Project boundaries.		would be initiated in advanced design phases of the project. The Richmond Highway (Route 1) Corridor Improvement Project would not preclude crossing improvements near and outside of the project boundaries, but such improvements would be beyond the scope of this project.
<b>Chesapeake Bay Preservation Act Resource Protection Areas (RPA) and Fairfax County Environmental Quality Corridors (EQC)</b>	Comments indicated potential project effects to Resource Protection Area as regulated by the Chesapeake Bay Preservation Act Resource Protection Areas and Fairfax County Environmental Quality Corridors be considered in the EA.	8	The Chesapeake Bay Preservation Act and regulations require that a vegetated buffer no less than 100 feet wide be located adjacent to and landward of all tidal shores, tidal wetlands, non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or along water bodies with perennial flow. Under Chapter 118 Article 5-2 of the Fairfax County Code of Ordinances, in conformance with Virginia Administrative Code 9VAC25-830-150, public roads are exempted from the CBPA conditioned on: (1) compliance with regulations promulgated pursuant to the Erosion and Sediment Control Law and with Chapter 104 of the County Code and the Virginia Stormwater Management Act and with Chapter 124 of the County Code, (2) an erosion and sediment control plan and a stormwater management plan approved by the Virginia Department of Conservation and Recreation, or (3) local water quality protection criteria at least as stringent as the above state requirements will be deemed to constitute compliance with this chapter. The exemption of public roads is further conditioned on the optimization of the road alignment and design, consistent with other applicable requirements, to prevent or otherwise minimize encroachment in the Resource Protection Area (RPA) and adverse effects on water quality. This expanded information was added to the Revised EA in Section 3.4.5 page 3-36.

Issue	Issue Description	Number of Comments	Response
			<p>County-designated Environmental Quality Corridors (EQC) are an open space system designed to link and preserve natural resource areas and provide passive recreation. The system includes stream valleys, wildlife habitats, and wetlands. As dictated by the County Comprehensive Plan 2017 edition Environment, as amended (3-14-2017), impacts of development on EQCs is generally prohibited except when disturbances serve a public purpose such as unavoidable public infrastructure easements and rights of way. Further, the Plan states stormwater management facilities should not be located in EQCs except under special conditions. This information has been added to the Revised EA in Section 3.4.1 Water Resources pages 3-26 – 3-28.</p> <p>Approximately 11 acres of RPA/EQC could be impacted based on LOD that includes new permanent right-of-way and a temporary construction easement in addition to the crossing structure that is assumed to be mainly fill under a worst-case scenario. This impact would likely be reduced in more advanced design based on spanning the streams with bridges rather than filling. VDOT would ensure the crossing designs meet the minimization of impacts and restoration commitments as specified in Fairfax County Ordinance 118 Article 5-2 and the Comprehensive Plan 2017 edition, as amended. This information has been added to the Revised EA in Section 3.4.5 on page 3-36.</p>
<b>Bicycle/Pedestrian Access</b>	Comments for and against pedestrian underpasses at the Dogue Creek and Little Hunting Creek were received. Some commenters felt a pedestrian underpass should not be placed in a floodplain, others were concerned about	8	<p>A survey was included in the PIM 4 meeting handout materials asking the attendees to provide input on whether or not to include pedestrian underpasses in the project (see Appendix B). The respondents' input would be considered in the final determination of whether or not to include the underpasses in the final design that is made in consultation with regulatory agencies and elected officials.</p>



Issue	Issue Description	Number of Comments	Response
	impact to wildlife from associated lighting or fencing, or had safety concerns for users. Others wanted pedestrian underpasses, felt they should connect to other existing trails, and need to be designed to ADA standards and to not adversely impact wildlife or wildlife habitat.		
<b>Anadromous Fish</b>	VDOT needs to ensure anadromous fish movement is not impeded on Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek before, during and after construction. Previous studies conducted by George Mason University identified anadromous fish upstream of the Richmond Highway	7	Comment on anadromous fish being documented upstream of Richmond Highway on Dogue Creek and potentially in North Fork Dogue Creek and Little Hunting Creek noted. Consideration of anadromous fish use areas is required under the Fish & Wildlife Coordination Act (16 U.S.C. 661-667e). The VDGIF and VMRC, in combination with NOAA Fisheries, oversee anadromous fish in Virginia. The EA and supportive studies used the VDGIF database to identify the Confirmed and Potential Anadromous Fish Use Areas in the direct and indirect effects study areas. This data set indicates Dogue Creek and the Potomac River are Confirmed Anadromous Fish Use Areas and Little Hunting Creek is a Potential Anadromous Use Area in areas that do not extend into the LOD. Language has been added to Section 3.4.2, page 3-30 of the Revised EA stating VDOT would include design and other measures that reduce direct impacts to anadromous fish and other aquatic wildlife during and after construction at Dogue Creek, North Fork Dogue Creek, and Little Hunting Creek. Potential indirect effects to anadromous fish are addressed in Section 3.9 page 3-54 of the Revised EA.

Issue	Issue Description	Number of Comments	Response
	crossing at Dogue Creek.		
<b>Trash Management</b>	Commenters indicate trash entering the streams crossing through the study area is a big problem and request that the project should address by providing instream trash traps.	6	VDOT does not have specific provisions for trash mitigation as part of the project, nor is there a specific regulatory requirement to mitigate for trash. It should be noted, however, that the project design would include stormwater treatment facilities along the corridor that will treat runoff from the road. By virtue of these facilities, there would be a reduction in the amount of pollutants, including solid waste in runoff, collecting in streams.
<b>Historic Huntley Viewshed</b>	VDOT needs to evaluate the potential visual impacts of the project to the Historic Huntley site viewshed.	5	<p>The Huntley Plantation is a 19th century homestead owned and managed by the Fairfax County Park Authority located about a half mile west of Richmond Highway at 6918 Harrison Lane. The site is listed on the National Register of Historic Places, the Virginia Landmarks Register, and the Fairfax County Inventory of Historic Sites. The Huntley Plantation is currently outside the area of potential effects defined for the Build Alternative under the Section 106 compliance process for the project (see the <i>Cultural Resources Survey for the Widening of U.S. Route 1 from Napper Road to Mt. Vernon Highway, Fairfax County, Virginia</i> technical report). The area of potential effects is defined by federal regulation as the geographic area or areas in which an activity may directly or indirectly cause alterations in the character and use of historic properties, if any such properties exist.</p> <p>To evaluate whether the area of potential effects should be expanded, a Geographic Information Systems visibility assessment tool was used to determine if the proposed Richmond Highway (Route 1) Corridor Improvement Project is within the viewshed of the Huntley Plantation. This analysis is added to the Revised EA in Section 3.5.1 Page 3-43. The analysis found the project is outside of the viewshed of the Huntley Plantation with no potential to directly or indirectly affect this historic property.</p>

Issue	Issue Description	Number of Comments	Response
<b>Noise Wall Design and Impacts</b>	Comments concerned minimizing noise walls, using noise abatement alternatives to noise walls, against placement of noise walls between sidewalk and bicycle paths, and wanting aesthetically pleasing noise wall design compatible with the planned Richmond Highway viewshed.	5	All potential noise barriers identified in the preliminary noise study for the EA would be evaluated again in the final design phase of the project using detailed construction plans, refined traffic data, and detailed existing/proposed surface information. Noise barriers that were found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the final design noise analysis. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be recommended for construction. Benefitted property owners would determine if they want sound barriers through a balloting process. Noise barriers would not likely be constructed between sidewalks and bicycle facilities built as part of the Build Alternative due to safety hazards and minimal change in acoustic values. The aesthetics and design of noise walls would be developed in advanced design and presented to agencies, benefitted receptors and the public for comment.
<b>Cultural Resources</b>	A Phase I archaeological and historic architectural resource survey should be completed for all previously unsurveyed areas. Consultation with the Department of Historic Resources (DHR) as the State Historic Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act should be completed.	5	Phase I archaeological and historic architectural surveys and consultation with DHR as well as Fairfax County Parks Authority as a consulting party to the Section 106 compliance process was completed as reported in Section 3.5 of the EA. The survey results were reported in: <i>Cultural Resources Survey for the Widening of US Route 1 from Napper Road to Mt. Vernon Highway, Fairfax County, Virginia</i> (2016) and <i>Supplemental Cultural Resources Survey Widening of US Route 1 from Napper Road to Mt. Vernon Highway, Fairfax County, Virginia</i> (2017). These reports are on file at VDHR and VDOT. The results of the Section 106 consultation determinations of National Register of Historic Places eligibility and finding of effect made by VDOT/FHWA and concurred with by DHR are summarized in Section 3.5 of the EA, and copies of correspondence between VDOT and DHR are included in Appendix A of the EA. If in advanced design the area of potential effects extends beyond the previously defined limits, VDOT would contact consulting parties and complete the Section 106 compliance process taking into account effects on historic properties for the expanded APE.

Issue	Issue Description	Number of Comments	Response
<b>Landscaping with Native Plants</b>	VDOT should use 100 percent native plants in landscaping plans.	5	The landscape design specifying particular plants to use would be completed in advanced design phases of the project and take into consideration the project setting, whether certain plants would attract wildlife species to the busy highway that would increase wildlife conflicts, habitat restoration plans and consultation with regulatory agencies.
<b>Interpretive Signing</b>	Interpretive signing should be provided along the roadway in the project area wherever important historic events or structures were located, or by scenic vistas or to interpret stormwater features and in-stream trash management structures.	4	Interpretive signing not specified by mitigation measures for the Original Mount Vernon High School, scenic vistas and other interpretation would be developed in consultation with regulatory agencies and Fairfax County in the advanced design phase of the project.
<b>Stormwater Management Facilities Coordination with BRT Project.</b>	Stormwater management facilities should be coordinated with the BRT project, so they are shared as much as possible, which should be described in the EA.	2	If the VDOT Richmond Highway (Route 1) Corridor Improvement Project and the Fairfax County's Richmond Highway Bus Rapid Transit Program acquire NEPA approvals and move forward to advanced design and construction, VDOT would work with Fairfax County to coordinate stormwater management design between the Jeff Todd Way and Napper Road intersections.
<b>Air Quality</b>	Comments question what impacts to air quality would occur	1	Potential air quality impacts of the alternatives are addressed on pages 3-44 to 3-48 of the EA and described in detail in the project Air Quality Report available on the project website at <a href="http://www.virginiadot.org/projects/northernvirginia/richmond_highway.asp">http://www.virginiadot.org/projects/northernvirginia/richmond_highway.asp</a> .

Issue	Issue Description	Number of Comments	Response
	from additional travel lanes		The project would not result in a violation of the National Ambient Air Quality Standards (NAAQS). No greenhouse gas analysis is warranted for the project that is an EA. The carbon monoxide (CO) and mobile source air toxics (MSAT) analyses conducted for the project are considered indirect effects analyses because they take into account air quality impacts attributable to the project that occur at a later time in the future. The project qualitative assessments indicate the potential for indirect CO and MSAT effects of the project would not be significant. The annual regional conformity analysis conducted by the National Capital Region Transportation Planning Board represents a cumulative impact assessment for purposes of regional air quality, includes the project and demonstrates this project's incremental impact on mobile source emissions is in conformance with the State Implementation Plan and will not cause or contribute to a new violation, increase in the frequency or severity of any violation, or delay timely attainment of the NAAQS established by the USEPA.
<b>Utilities</b>	The EA did not evaluate the potential impacts of utility relocations.	1	All utility relocations are currently planned to be relocated in existing right-of-way. As stated in Section 2.3.2 page 2-5 of the EA, this area is included in the Limits of Disturbance within which impacts of the Build Alternative to the human and natural environment were evaluated in the EA.
<b>Climate Change/Resiliency</b>	Adaptations to design anticipating climate change should be evaluated in the EA.	1	Specific design details regarding designing climate change resiliency and adaptation measures could not be developed at the planning level design completed for the EA with a design horizon of 2040. The height of the roadway and bridge design to minimize climate change impacts would be considered in advanced design phases.



**TABLE 2: Substantive Individual Comments Addressed**

	Comments	Responses
1	11-foot lane widths are too wide, should consider 10-foot widths.	11-foot lanes are the minimum width recommended by VDOT for safe and efficient operation along the corridor and are specified for this project.
2	Eliminate right turn lanes or double turn lanes that encourage high driver speeds, use valuable land, increase intersection crossing distances, and increase bicycle/pedestrian conflicts.	The EA evaluates potential human and environmental impacts based on planning level design. The number and location of turn lanes would be developed in advanced design that considers forecasted turning movements and safety in accordance with VDOT design standards.
3	The <i>Natural Resources Technical Report</i> refers to a separate <i>Endangered Species Report</i> . If so can a copy be uploaded to the project website, and the comment period extended for review?	Report has been added to the website. As the potential impacts to threatened and endangered species is summarized in the EA and <i>Natural Resources Technical Report</i> available online during the EA comment period, an extension of the comment period is not warranted.
4	Positive enhancements to environmental conditions need to be identified and added to the EA.	Comment noted. Positive enhancements to natural resources have been added to the EA throughout Section 3.4.
5	The EA needs to mention the approved EMBARK Comprehensive Plan amendment and the project goals aligned with the Plan.	Description of the Comprehensive Plan 2017 edition amendment (3-20-2018) to Embark (2017-10 & 2017 P-02) has been added to Section 3.2.1, page 3-8 of the Revised EA. If the project proceeds to design and construction, the specific mitigation measures for floodplain impacts would be developed in advanced design in consultation with regulatory agencies and Fairfax County. The EMBARK specific performance targets would be considered for appropriate optimization and water quality controls in accordance with the Plan amendments in advanced design.
6	VDOT should exceed County ordinances to protect natural and cultural resources, including exceeding stormwater requirements	VDOT would confer with regulatory agencies, Fairfax County, elected officials and consulting parties in development of detailed mitigation measures for natural and cultural resources in advanced design and permitting, assuming the project would move forward after a NEPA decision.
7	The study area should be expanded to include from Pole Road to Route 235 to monitor for protected species and accommodate climate	As shown on Figure 3-2, page 11 of the project <i>Indirect and Cumulative Effects Technical Report</i> , the area from Pole Road to Route 235 is encompassed by the Natural Resources ICE Study Area and potential indirect and cumulative impacts to natural

	Comments	Responses
	change resilience and indirect impacts from the project.	resources are assessed. The study area includes all of the HUC 12 watersheds for Dogue and Little Hunting Creeks intersected by the project to the Potomac River.
8	Environmental features impacted by the project should be restored to the fullest extent and detailed in the EA.	Comment noted. Specific mitigation measures would be developed in advanced design and permitting phases in consultation with regulatory agencies, Fairfax County and elected officials.
9	State, Federal or Global Status of rare, threatened or endangered plant species are not discussed in the EA.	At the time the of the project <i>Rare, Threatened and Endangered Species Report</i> , the <i>Natural Resources Technical Report</i> , the <i>Indirect and Cumulative Effects Report</i> and the EA were written, a search of state and federal databases did not indicate the presence or potential habitat of listed plant species in the project direct effects or the larger indirect effects study areas. State and federal databases of rare, threatened and endangered species have been re-consulted for preparation of the Revised EA.
10-12	10) The International Union for the Conservation of Nature (IUCN) red listed species in the project area should be identified and considered by the project. 11) The expanded study area should be field investigated for IUCN listed species and globally rare habitat identified at the Huntley Meadows Park over more than one season. 12) The presence of Coastal Plain Depression Swamp should be documented by the project along Dogue Creek between Pole Park Road and the Potomac River and protected.	As there is no state or federal regulatory guidance for the consideration of potential individual project impacts to IUCN red-listed species or globally rare habitat, species or critical habitat not listed by the State of Virginia, the USFWS or NOAA are not evaluated in the EA or supporting documents.
13	The spotted turtle is a protected species missing from the EA and is known to occur less than 0.5 miles from the project area.	Both federal and state lists were examined again for the Revised EA. The lists do not include the spotted turtle as threatened or endangered. Spotted turtle is not confirmed by VDGIF within the project study area. The species is identified as a collection concern by VDGIF.
14	Time of year restrictions (TOYR) should be implemented for all work done on the project	Any TOYR protecting wildlife as identified in the permitting phase would be observed during construction.

	Comments	Responses
	to minimize impacts to wildlife and anadromous fish.	
15	VDOT is incorrect in stating that the project will not impact Fairfax County Park Authority Properties. Pole Road Park, Little Hunting Creek Park, and Vernon Heights Park are impacted. Consult Fairfax County to determine specific acreage impacted. All impacts should receive compensatory mitigation at a rate of 2:1 with restored conditions on new land with a conservation easement in perpetuity.	Using Fairfax County Parks GIS providing park boundaries and planning level design, the Build Alternative would have no direct impact to any Fairfax County Park Authority properties. Potential indirect effects are identified in the project <i>Indirect and Cumulative Effects Technical Report</i> , are summarized in Section 3.9 of the EA and with minimization and mitigation measures, would have no substantial adverse effects to County parks.
16	On page 13 of the <i>Natural Resource Technical Report</i> the Virginia Construction General Permit Stormwater Pollution Prevention Plan description is missing solid waste pollution. Collection devices should be installed all along the length of the roadway.	If the project proceeds to construction, VDOT would comply with the Virginia Construction General Permit Stormwater Pollution Prevention Plan that specifies measures for controlling solid waste resulting from construction activities.
17	Combining or co-locating utilities and telecommunication poles to minimize the number of poles is highly desired and should be on only one side of the highway, and not in a location that would impact the Historic Huntley viewshed.	See Historic Huntley Viewshed Issue response regarding viewshed impacts. Regarding utility pole numbers and locations, VDOT would work with utility companies to relocate utility poles outside of the proposed roadway. Typically, multiple utility companies will share poles for their overhead lines; however, some may need to run lines along both sides of the road for distribution purposes.
18	Fairfax County should receive compensatory mitigation of land purchase for taking land from the historic Original Mount Vernon High School.	See Section 3.5.3 Page 3-45 of the Revised EA describing the potential effects of the Build Alternative to historic properties and mitigation measures. VDOT has coordinated with Fairfax County who participated as a consulting party in the Section 106 of the NHPA compliance process for the proposed project. VDOT/FHWA have made a finding of no adverse effect to the historic Original Mount Vernon High School, based in part on completing an oral history of the school and providing interpretive signing at the site, to which the DHR and the County have concurred (Appendix A).

	Comments	Responses
19	On page 10 of the <i>Natural Resources Technical Report</i> in <b>Table 2-1</b> and <b>2-2</b> (and possibly in other references in this or other reports) there is reference to a Route 622. This highway is not near the project area and should be corrected.	The reference to Route 622 to describe the impairment reach for Dogue Creek in Table 2-1 of the NRTR is directly from the VDEQ's 2014 <i>Virginia Water Quality Assessment 305(b)/303(d) Integrated Report</i> Appendix 5, page 43. "Impairment begins at the confluence with an unnamed tributary to Dogue Creek, approximately 0.3 river miles upstream from Rt. 622, and continues downstream until the end of the free-flowing waters of Dogue Creek."
20	Scenic vista points on both sides of the highway to serve as rest areas for pedestrians and bicyclists are needed.	The provision of scenic rest areas for bicycle and pedestrian facilities would be considered in advanced design phases of the project, developed in consultation with Fairfax County and elected officials.
21	A pillar support structure should be used for the roadway to provide the best wildlife friendly crossing.	Particular measures to provide wildlife-friendly stream crossings would be developed in advanced design phases and permitting.
22	In the <i>Natural Resources Technical Report</i> , page 16, <b>Section 2.2.2</b> Existing Conditions: Terrestrial Wildlife/Habitat: The phrase "open water areas are common" should not be used.	The <i>Natural Resources Technical Report</i> was completed in support of agency consultation and the release of the EA for public and agency comment and is therefore not subject to revision at this time. The Revised EA does not include the phrase of concern to the commenter.
23	While habitat may appear to be fragmented, the distribution of wildlife using the river corridors indicates connected habitat.	Comment noted.
24	The anadromous fish discussion on page 18 of the <i>Natural Resources Technical Report</i> overlooks the possibility that anadromous fish would return with tidal influence restored by rising river waters due to climate change.	Comment noted. The planning horizon for this EA is to 2040. Whether tidal influence would be restored to the streams in the study area by 2040 is unknown and is therefore not discussed in the EA.
25	English ivy is not listed on the invasive plant list in the Environmental Assessment, however this plant is found in the Mount Vernon District.	The EA lists highly invasive species observed in the field at WOUS field investigation points (Section 3.4.8 page 3-40). Section 3.4.8 page 3-41 of the Revised EA provides a link to the VDCR-DNH and Virginia Native Plant Society online lists of invasive plant species in Virginia.
26	An invasive species management plan for both terrestrial and aquatic species should be followed by all contractors for the project.	Comment noted. If the project proceeds to construction, VDOT would adhere to provisions in VDOT's Road and Bridge Specifications that include management of invasive species.

	Comments	Responses
27	Guidance for residents on how to express concerns about inappropriate handling of work, code violation, or environmental harm of the project should be given.	If the project proceeds to construction, VDOT or the construction contractor would develop a project web-page with contact information for citizens to express concerns or ask questions about the project.
28	Any soils removed should be re-used at other projects in the Coastal Plain before disposal elsewhere.	Comment noted.
29	Concerned about the direct and indirect adverse impacts to lower income and minority populations health that may occur, particularly reduced air quality, increased noise and increased vibrations. Residents may need relocation that follows federal and state guidelines.	Comment noted. Potential direct, indirect and cumulative impacts of the project to minority and low-income populations in the study area have been evaluated in the project <i>Socioeconomics and Land Use Technical Report</i> , the <i>Indirect and Cumulative Impacts Technical Report</i> , and summarized in Section 3.3.4 of the EA. The minority or low-income status of any resident that may be displaced would be determined in the right-of-way acquisition phase of the project. Should any relocations of minority or low-income persons occur, relocations would be completed in accordance with the Uniform Relocation and Real Property Acquisition Act (1970).
30	No net loss to affordable housing should occur.	Comment noted. The only subsidized housing in the project study area is the Spring Garden Apartments. As stated in the Errata Notice of the EA (pages 3-23 to 3-24), no residential displacements would occur at the Spring Garden Apartments.
31	VDOT should partner with Fairfax County, Dominion Energy and other utilities to underground all utilities on both sides of the roadway.	Undergrounding utilities would be decided by the utility in consultation with Fairfax County, and is beyond the scope of this transportation project.
32	Provide plantings in the vicinity of bus stops and a bench to make waiting for a bus more pleasant.	Comment noted. Landscape design would be completed in advanced phases of the project in consultation with Fairfax County and other regulatory agencies.
33	Because the project would impact the 80-foot wide easement across private land for access to Pole Road Park from Richmond Highway, public access should be re-established, and environmental improvements and trail connections to Pole	Comment noted. See Compensatory Wetland, Stream and Floodplain Mitigation Issue response. A public access easement off Richmond Highway to Pole Road Park would remain beyond the proposed project right-of-way in that location.



	Comments	Responses
	Road Park should be considered for mitigation.	
34	VDOT's Natural Resources Technical Report emphasizes the fragmented wildlife habitat along Richmond Highway, but Dogue Creek has extensive habitat all the way to the Potomac River, and Pole Road Park, forest buffers on Fort Belvoir, and Huntley Meadows Park are nearby.	Comment noted. The report describes habitat in the natural resources' direct effects Study Area.
35	Potential effects to all wildlife, not just protected species, should be addressed.	Comment noted. Potential impacts to wildlife and wildlife habitat is evaluated in detail in the project <i>Natural Resources Technical Report</i> and the <i>Indirect and Cumulative Impacts Technical Report</i> and summarized in Sections 3.4 and 3.9 of the EA.
36	The EA should be updated to recognize the Embark Plan Amendment adopted into the Fairfax County Comprehensive Plan in March 2018.	The Revised EA updates mention of the Embark Plan Amendment in Section 3.2.1 page 3-8.
37	The EA should make it clear that the study area is within both the Mount Vernon and Lower Potomac Planning Districts.	According to Fairfax County GIS data for planning area boundaries and as shown on the County website ( <a href="https://www.fairfaxcounty.gov/planning-zoning/comprehensive-plan/area-iv">https://www.fairfaxcounty.gov/planning-zoning/comprehensive-plan/area-iv</a> ), the EA study area is totally within the Mount Vernon Planning District.
38	Fairfax County encourages VDOT to avoid, minimize and reduce property impacts to minority and low-income communities, including Spring Garden Apartments.	Comment noted. As stated in the EA Errata Notice, no potential relocations would occur at the Spring Garden Apartments.
39	VDOT should discuss short-term versus long-term wetland impacts in the EA.	Long-term direct impacts to wetlands are described in the EA in Section 3.4. Approximately 0.2 acre of wetlands would be directly impacted in the long term. Discussion of short-term impacts to wetlands during construction has been added to Section 3.4 page 3-28 in the Revised EA. Long-term and short-term indirect and cumulative impacts to wetlands are discussed in Section 3.9 page 3-54 of the Revised EA.

	Comments	Responses
40	The limits of disturbance to wetlands are likely to extend beyond the limits of roadway improvements.	The planning level LOD used to assess direct impacts to wetlands includes the grading limits, permanent right-of-way and temporary right-of-way areas needed to construct the Build Alternative.
41	It is not clear if the wetland impact area noted in the EA represents construction and/or post-construction impacts.	Wetland impact areas in the EA vary depending on whether it would be a direct, indirect or cumulative effect. Also see response to #40 comment above.
42	Other impacts to the streams noted are not fully addressed.	The comment is not specific enough to evaluate which stream impacts the commenter thinks may not be fully addressed in the EA.
43	The County supports relying on the Virginia Runoff Reduction Method (VRRM) to address water quality and volume controls to better replicate predevelopment conditions.	Comment noted. The EA discusses using the VRRM in Section 3.4.1 page 3-27.
44	The County requests the Fairfax County Architectural Review Board be consulted for any physical or visual impact from the proposed project in or adjacent to Historic Overlay Districts.	Comment noted. A portion of the project is in the Woodlawn Pope-Leighey Overlay District. Fairfax County has participated as a consulting party in the Section 106 consultation that found no adverse effect would occur from the undertaking to the historic setting and feeling of the Woodlawn Plantation and the Woodlawn Cultural Landscape Historic District (including the Sharpe Stable Complex). This was based on the setting and feeling already having lost integrity due to other recent transportation projects in the area of potential effects of the Richmond Highway (Route 1) Corridor Improvement Project in the Woodlawn Pope-Leighey Overlay District, with which DHR concurred (see Appendix A letter).
45	VDOT should consider mitigation alternatives to noise walls.	The type of noise abatement would be developed in consultation with benefited property owners and in accordance with VDOT procedures.
46	A graphic depicting a typical noise barrier potentially used in the project corridor would be helpful.	Comment noted. Noise impacts are evaluated in the EA using planning level design that does not include detailed noise wall designs.
47	If noise studies in the advanced design phase show an increased impact to Vernon Heights Park, Little Hunting Creek Park, or Pole Road Park, the Fairfax County Parks Authority requests excess noise be mitigated in	All noise impacts would be mitigated in accordance with all applicable federal, state and local laws and regulations.

	Comments	Responses
	accordance with all applicable federal, state and local laws and regulations.	
48	Should it be determined during final design, grading, utility easements and maintenance of traffic plans that Spring Garden Apartments need to be acquired for right-of-way, I request the project be designed to add a 4th northbound lane between the Mount Vernon (Route 235) / Buckman Road intersection and Sherwood Hall Lane.	Comment noted. Potential effects of the Build Alternative examined in the EA were determined using planning level design. As stated in the Errata Notice of the EA (3-23 to 3-24), based on planning level design, no residential displacements would occur at the Spring Garden Apartments, the only low-income population in the study area.
49	The Mount Vernon Memorial Highway (Route 235) / Jeff Todd Way intersection has been reconstructed many times without solving all the transportation issues. Please address the needs of traffic on the Mount Vernon Memorial Highway approach to this intersection once and for all.	Comment noted. Impacts of the Build Alternative evaluated in the EA are based on planning level design. Traffic issues on Richmond Highway at the intersection of Mount Vernon Highway (Route 235) / Jeff Todd Way would be studied in detail and addressed in more advanced design.
50	Our American Legion Post 177 property at [3427] Buckman Road should be listed in the EA as a Community Center / Non-profit on pages 3-14 and 3-15.	The American Legion property at 3427 Buckman Road is a vacant lot. Because the property is undeveloped and provides no services to the community, it was not evaluated as a Community Facility in the EA.
51	The American Legion should be listed as a community organization on page 4-3 of the EA.	Because the American Legion's property at 3427 Buckman Road is undeveloped and does not provide services to the community, the American Legion Post 177 was contacted as one of the 806 property owners within one-quarter mile of the project during scoping; these contacts are not individually listed in the EA.
52	The assessment fails to consider quality of life impacts to our already high-density community.	Quality of life is subjective and varies from person to person. The Richmond Highway (Route 1) Corridor Improvement Project is consistent with Fairfax County land use planning that governs density of development as expressed in the Fairfax County Comprehensive Plan (as amended).

	Comments	Responses
53	I am happy to see retention ponds and other ways to address storm water runoff that is not currently happening.	Comment noted.
54	The retainment walls need to be designed not to affect property values	Specific design of retaining walls would be included in the advanced design phase of the project, assuming NEPA approval is obtained and the project advances to construction.
55	Do not take away apartments of Spring Gardens.	As stated in the Errata Notice of the EA, no residential relocations are anticipated at the Spring Garden Apartments.
56	Should address pedestrian access.	Specific pedestrian access cannot be evaluated with planning level design completed for the EA. Specific pedestrian access would be addressed in advanced design if NEPA approvals are obtained and design and construction proceeds.
57	Should address cost effectiveness by adding two bus lanes.	The Build Alternative evaluated in the EA does not specify dedicated bus lanes; only one additional travel lane in either direction is proposed, and a wider median is included to accommodate future transit. The potential effects of future transit in the median in the Richmond Highway (Route 1) Corridor Improvements Project study area (i.e. from Jeff Todd Way to Napper Road) are being evaluated by Fairfax County and the Federal Transit Administration for the Richmond Highway Bus Rapid Transit Program.
58	Assessment and presentation were fine. I think much more money will be needed to complete this project than has been approved.	Comment noted. A detailed cost estimate would be completed in advanced design.

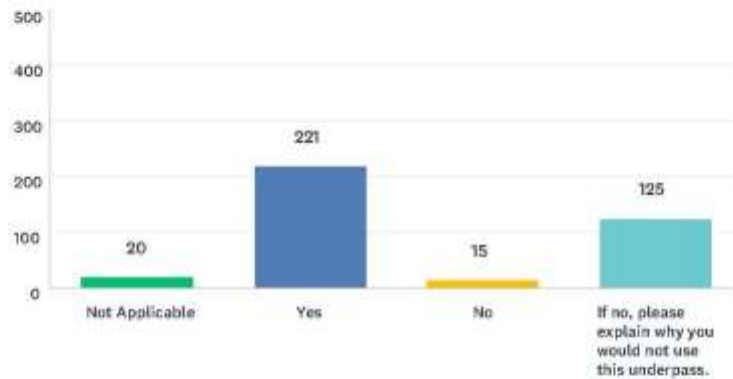
## **Appendix B: Pedestrian Underpasses Survey**



Richmond Highway

**Q1 Little Hunting Creek (under Richmond Highway between Buckman Road and Napper Road)**

Answered: 381 Skipped: 1



ANSWER CHOICES	RESPONSES
Not Applicable	5.25% 20
Yes	58.01% 221
No	3.94% 15
If no, please explain why you would not use this underpass.	32.81% 125
<b>TOTAL</b>	<b>381</b>

#	IF NO, PLEASE EXPLAIN WHY YOU WOULD NOT USE THIS UNDERPASS.	DATE
1	Rather cross at a signal	4/26/2019 4:03 PM
2	Not saying I wouldn't, but it would need to feel safe from a personal safety perspective and easy to access-- the tight turnaround to access the tunnel feels difficult to maneuver on a bike and potentially tough to get away from someone, should the need arrive.	4/26/2019 10:53 AM
3	Dangerous at night. Would rather build over pass in the future	4/26/2019 10:35 AM
4	Strong concerns about safety in this "out of public view" areas under the road	4/26/2019 10:00 AM
5	High crime area and an underpass would create concealment for criminal activity (i.e. robbery, sexual assault, etc)	4/26/2019 12:33 AM
6	I'm concerned about my safety. Going below the highway and not being visible to others puts me at a much greater risk for becoming a crime victim.	4/25/2019 11:47 PM
7	Will attract undesirable/dangerous activity, will add significant construction expense, and concern about future maintenance issues (lighting, trash collection, crime).	4/25/2019 10:59 AM
8	Dangerous as a woman.	4/25/2019 6:50 AM
9	I don't live in the area	4/25/2019 2:19 AM
10	Personal safety	4/24/2019 8:02 PM
11	Not safe for pedestrians.	4/24/2019 7:54 PM
12	Dangerous for potential crime - overpass better	4/24/2019 10:49 AM
13	I'd rather risk getting hit by a car than being assaulted in a hidden underpass.	4/24/2019 7:23 AM

**Richmond Highway**

14	Safety concerns especially at night.	4/23/2019 7:35 PM
15	Would not feel safe	4/23/2019 3:43 PM
16	It is potentially dangerous, and there is already enough construction on Richmond Hwy.	4/23/2019 12:37 PM
17	I'd be afraid of what was hiding in the underpass. A overpass would be much preferred.	4/23/2019 12:15 PM
18	Doesn't sound safe if no one is around and not in public view	4/23/2019 11:41 AM
19	As designed, the underpass is much longer than a straight crossing. It also leaves me feeling vulnerable to harassment and attack that can't be seen by passers-by. It's also not at the intersection and that makes it even more out of the way for users.	4/23/2019 9:32 AM
20	Safety	4/23/2019 9:01 AM
21	As a female I don't feel safe going under a road. over I'd do. I'm a runner and an frequently in roads so safety is a concern.	4/23/2019 6:11 AM
22	The current design looks unsustauntable from a safety and cleanliness perspective.	4/23/2019 4:45 AM
23	Underpasses are dangerous for pedestrians because they can't be seen. I can see rapes, murders, assaults, robbery, kidnapping and the like occurring. Overpasses are the way to go.	4/23/2019 4:01 AM
24	Don't want any opportunities for crime, drugs or homeless camp outs.	4/22/2019 9:49 PM
25	I don't think I would feel safe there especially with a young daughter	4/22/2019 9:33 PM
26	It will be dangerous.	4/22/2019 9:21 PM
27	Safety. Can't be seen by anyone above.	4/22/2019 3:40 PM
28	Don't find myself walking across or bicycling there.	4/22/2019 12:08 PM
29	too much criminal activity in the area	4/22/2019 9:33 AM
30	Homeless and criminal element likely present there.	4/22/2019 8:03 AM
31	Unsafe for women/ how about a bridge above ground!	4/22/2019 7:21 AM
32	Safety concern and homeless taking up residence. pedestrian overpass should be considered.	4/21/2019 8:04 AM
33	don't consider crossing in tunnel safe. doesn't make sense	4/20/2019 11:29 AM
34	I don't walk along Richmond Highway	4/19/2019 7:25 PM
35	I would not feel safe	4/19/2019 3:06 PM
36	I find underpasses to be unsafe and dirty, especially as a woman. It would have to be lit up as bright as daylight at all times in order for me to consider using it.	4/19/2019 2:26 PM
37	Safety concerns	4/19/2019 1:13 PM
38	Do not live near them to use. I have car	4/19/2019 10:32 AM
39	I would use the underpass only if well lit & safe	4/19/2019 9:52 AM
40	Safety; who is going to clean? flooding	4/19/2019 8:36 AM
41	That section of creek is already troubled. It would only get worse and be a safety issue if a pedestrian underpass were there.	4/19/2019 2:01 AM
42	the majority of people who cross Rt 1 in that block will not walk the extra distance, unless there is a 10 ft barrier down the middle of the road they will continue to walk across the highway even if 6 lanes. It would be a waste of money.	4/19/2019 1:12 AM
43	Not safe	4/19/2019 12:40 AM
44	will flood, be impassable, and fill with trash hazardous to riding	4/18/2019 11:03 PM
45	Safety...creepy!	4/18/2019 10:11 PM
46	I would not use this underpass as I have a car. However, the residents of Gum Springs would use it to get to Costco and WalMart and the students who walk to Mount Vernon High School from the Lee District Side of Rt. 1 would also use it.	4/18/2019 9:52 PM
47	Too dangerous. This is not the safest area to walk underground.	4/18/2019 9:48 PM

**Richmond Highway**

48	I live on the east side of Richmond highway near MVHS and have no reason to walk to any establishment on the other side. It's too far to walk to shopping venues and there is no recreational attraction. The improvements will benefit the neighborhoods on either side of Richmond highway and I will appreciate the improved road and aesthetics. But it does not significantly effect my life.	4/18/2019 9:39 PM
49	dangerous move--to risky	4/18/2019 9:25 PM
50	Safety - individuals especially folks walking alone, the elderly and women will be targets for gangs, robbers and sexual predators. Vandalism - the walls of the underpasses will be canvases for individuals to express themselves, litter and human waste - lack of cleanliness -- the underpass walls will serve as an outdoor toilet for folks to relieve themselves, lastly the underpasses will provide a shelter for homeless folks to shelter in which in turn raises sanitation and litter issues	4/18/2019 9:07 PM
51	no one is walking in these two locations so why build there? are you inviting people to come there to cross? This is crazy.	4/18/2019 8:57 PM
52	Very dangerous	4/18/2019 8:55 PM
53	Because this is a dangerous part of our neighborhood and wouldn't be safe	4/18/2019 8:35 PM
54	There are sufficient crosswalks, without spending this money.	4/18/2019 6:28 PM
55	Email	4/18/2019 6:12 PM
56	Unnecessary	4/18/2019 5:27 PM
57	I am concerned about getting mugged because an underpass takes individuals out of public view. I would also be concerned about possible standing water. Having surfaced these concerns the concept is a good idea if it is handicap accessible and if pedestrians can still access a street-level cross walk if they so choose.	4/18/2019 5:15 PM
58	Too dangerous over pass safer	4/18/2019 5:02 PM
59	Too expensive.	4/18/2019 4:53 PM
60	To much crime, drugs & potential prostitution potential!	4/18/2019 4:35 PM
61	The folks cross in the middle of the block to get to the 7-11 don't think they would walk a longer distance	4/18/2019 4:07 PM
62	For all the disadvantages listed in the proposal: Safety • Maintenance • Trash • Graffiti • Snow • flooding	4/18/2019 3:59 PM
63	will be dirty, dark, unsafe	4/18/2019 3:50 PM
64	Am never on foot in that area. Complete waste of money unless the road is fenced off to prevent crossing at the surface level	4/18/2019 3:33 PM
65	I feel it would be unsafe. People could be assaulted.	4/18/2019 3:29 PM
66	This underpass is ina crime ridden area and will only provide cover for criminal activities.	4/18/2019 3:24 PM
67	It will be a dark, unsupervised place that will be more often used for activities that I don't want to walk past. I would use an overpass.	4/18/2019 3:12 PM
68	Safety in the area is a concern and an underpass will compromise personal safety. Vehicle vs. pedestrian safety will improve, but assaults and robberies may increase.	4/18/2019 3:10 PM
69	Criminals in the area will be mugging people in no time. I live here and no the area.	4/18/2019 1:21 PM
70	Safety concerns: it's a long underpass, and pedestrian traffic (eyes on the street) will be minimal	4/18/2019 12:23 PM
71	Unsafe idea, asking for crime	4/18/2019 12:14 PM
72	Safety - Buckman road not the greatest area!	4/18/2019 11:45 AM
73	Too much potential for running into a dangerous situation.	4/18/2019 11:36 AM
74	unsafe, will become a crime ridden area	4/18/2019 11:30 AM
75	No reason for over or under	4/18/2019 11:24 AM
76	safety, 7Eleven store must be relocated. The store brings too many pedestrian, traffic and crime issues.	4/18/2019 11:14 AM
77	wouldn't feel safe	4/18/2019 11:12 AM



**Richmond Highway**

78	Maybe, depends how it would connect to the cycling infrastructure on surrounding/connecting streets	4/18/2019 10:24 AM
79	Underpasses attract litter and are less safe than overpasses because their is less visibility. They could attract crime and loitering.	4/17/2019 6:39 AM
80	Pedestrian underpasses are magnets for crime.	4/16/2019 5:16 PM
81	If lighting and safety addressed then yes	4/16/2019 5:07 PM
82	It will not be maintained and with the crime rate in that neighborhood it creates a very unsafe place. Proper signaling and crosswalks are safer due to the violence in that area.	4/16/2019 4:28 PM
83	My experience with this type of underpass becomes a haven for crime, debris, and rodents/pests. Would prefer an open-air overpass.	4/15/2019 10:31 AM
84	Magnet for crime	4/14/2019 8:34 PM
85	Pedestrian underpasses are magnets for crime and squalor.	4/11/2019 11:01 PM
86	Safety Concerns	4/11/2019 9:56 PM
87	It could be dangerous for the pedestrians and bicyclists	4/11/2019 1:28 PM
88	potential danger of mugging	4/11/2019 5:41 AM
89	underpasses make easy spots for muggers to take advantage of people	4/10/2019 10:40 PM
90	lack of security, would provide cover for drugs, crime	4/10/2019 2:13 PM
91	I don't cross Richmond Highway anywhere near that location. Also, I wouldn't feel comfortable using the underpass at night. Additionally, my past experiences with other underpasses are that they become cluttered with trash, and smelly from public urination.	4/10/2019 2:49 AM
92	I don't believe this is an area where you find a lot of people trying to cross. There is also a crosswalk for people to use not that far away. Both are not located in the best of areas so safety would also be a concern.	4/9/2019 9:22 PM
93	Possibility of crime	4/9/2019 7:55 PM
94	Potential crime area	4/9/2019 6:56 PM
95	I think that it's a starting point for issues (crime, garbage) and will not be properly maintained and will quickly go downhill.	4/9/2019 4:30 PM
96	too many opportunities for crime & other activities in that area	4/9/2019 2:22 PM
97	Scared	4/9/2019 1:28 PM
98	too easy for vandals, thugs and miscreants to take advantage of people crossing underground out of sight	4/9/2019 10:44 AM
99	If they are dark and closed = equals safety concerns	4/9/2019 10:23 AM
100	Not a good crossing location	4/9/2019 9:24 AM
101	Not many people cross there and it seems like a place for criminals to hide out for mugging.	4/8/2019 9:31 PM
102	no side walks to get to the underpass from my home; unsafe area; expensive	4/8/2019 6:58 PM
103	The underpass is a ridiculous idea for security and crime reasons to begin with!	4/8/2019 5:34 PM
104	I would not feel safe going underground into the darkness by myself, especially if there is no security or maintenance planned.	4/8/2019 5:10 PM
105	Danger	4/8/2019 5:07 PM
106	SAFETY is a huge concern, as is maintenance	4/8/2019 5:02 PM
107	Already an unsafe area and this would increase the issues	4/8/2019 4:34 PM
108	There are appropriate crosswalks at Buckman and at Ladsen.	4/8/2019 4:34 PM
109	Would not feel safe.	4/8/2019 4:27 PM
110	No underpass	4/8/2019 12:43 PM

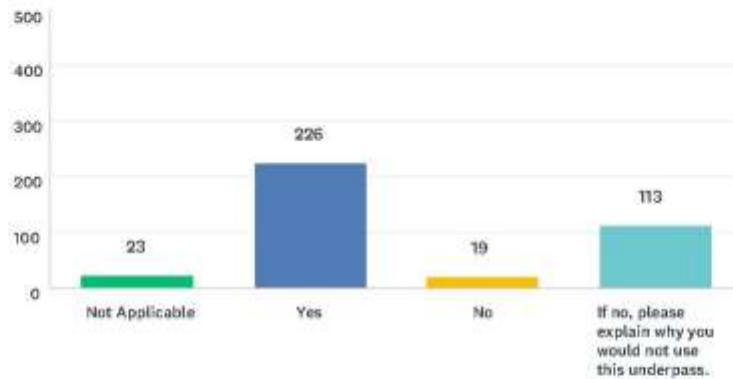
**Richmond Highway**

111	Buckman has a high crime rate. I would be concerned for my safety and would avoid walking in that area, especially in a tunnel like structure	4/7/2019 11:45 PM
112	This is not a heavy pedestrian area and people disregard safe and legal crossings on route 1 altogether	4/7/2019 11:06 PM
113	Not at convenient location	4/7/2019 10:09 PM
114	Underpass may be used as temporary home for homeless individuals. VDOT and FCPD do not have adequate resources to ensure the safety of individuals using the underpass. Knowing that most illegal activities occur during darkness, the underpass would draw similar illicit activities. It is doubtful that VDOT would provide adequate maintenance particularly during the winter since it's most likely there may be a flooding problem with the underpass.	4/6/2019 10:23 PM
115	Under the bridge = FLOODING - NOT CONDUCTIVE TO CYCLING OR WALKING	3/30/2019 8:33 AM
116	As a woman, no. Even in daylight it would be risky.	3/29/2019 12:19 PM
117	Safety concerns, homeless people, criminals	3/28/2019 4:29 PM
118	I would consider it unsafe at any time of the day or night.	3/28/2019 3:29 PM
119	Crime, lighting, trash, snow, water spray painting issues.	3/27/2019 8:17 AM
120	Switchbacks are difficult to navigate at speed. Underpass likely to flood often. Also likely to be utilized as homeless camp.	3/26/2019 11:57 PM
121	While convenient to build at the bridges, theres NOTHING around the sites that causes one to want to cross the street.	3/26/2019 10:19 PM
122	Wondering how this would affect the back of the houses on Napper Road which the creek flows behind	3/26/2019 7:23 AM
123	Would create environmental and security problems.	3/25/2019 11:13 PM
124	Too dangerous	3/25/2019 8:46 PM
125	Safety - if I were alone I would be extremely cautious about using such an isolated route. An overpass or street level crossing would be safer.	3/25/2019 4:11 PM

Richmond Highway

**Q2 Dogue Creek (under Richmond Highway between Jeff Todd Way and Sacramento Drive)**

Answered: 381 Skipped: 1



ANSWER CHOICES	RESPONSES
Not Applicable	6.04% 23
Yes	59.32% 226
No	4.99% 19
If no, please explain why you would not use this underpass.	29.66% 113
<b>TOTAL</b>	<b>381</b>

#	IF NO, PLEASE EXPLAIN WHY YOU WOULD NOT USE THIS UNDERPASS.	DATE
1	Rather cross at a signal and not much in this area worth crossing the road here.	4/26/2019 4:03 PM
2	Not saying I wouldn't, but it would need to feel safe from a personal safety perspective and easy to access-- the tight turnaround to access the tunnel feels difficult to maneuver on a bike and potentially tough to get away from someone, should the need arise.	4/26/2019 10:53 AM
3	Dangerous at night. Would rather build over pass in the future	4/26/2019 10:35 AM
4	I do not live nearby. If I did use it, it would probably be only for very occasional recreation use.	4/26/2019 12:39 AM
5	High crime area and an underpass would create concealment for criminal activity (i.e. robbery, sexual assault, etc)	4/26/2019 12:33 AM
6	I'd be concerned for my safety due to isolation and increased risk of becoming a victim of crime.	4/25/2019 11:47 PM
7	See above	4/25/2019 10:59 AM
8	I don't live in the area	4/25/2019 2:19 AM
9	Safety concerns; flash flooding; debris & refuse.	4/24/2019 10:37 PM
10	Same as above	4/24/2019 8:02 PM
11	Not safe for pedestrians.	4/24/2019 7:54 PM
12	Dangerous for potential crime - overpass better	4/24/2019 10:49 AM
13	same as above	4/24/2019 7:23 AM
14	Safety concerns, especially at night.	4/23/2019 7:35 PM



**Richmond Highway**

15	Would not feel safe	4/23/2019 3:43 PM
16	This area is not safe enough for me to use anything that's not exposed to the public.	4/23/2019 1:32 PM
17	Same reason.	4/23/2019 12:37 PM
18	I'd be afraid of what was hiding in the underpass. A overpass would be much preferred.	4/23/2019 12:15 PM
19	Doesn't sound safe if no one is around and not in public view	4/23/2019 11:41 AM
20	As designed, the underpass is much longer than a straight crossing. It also leaves me feeling vulnerable to harassment and attack that can't be seen by passers-by. I can't tell what intersection crossing this is supposed to be in place of. Also it's even longer than the Little Hunting Creek tunnel.	4/23/2019 9:32 AM
21	Safety	4/23/2019 9:01 AM
22	Sans as above	4/23/2019 6:11 AM
23	The current design looks unsustantable from a safety and cleanliness perspective	4/23/2019 4:45 AM
24	Underpasses are dangerous for pedestrians because they can't be seen. I can see rapes, murders, assaults, robbery, kidnapping and the like occurring. Overpasses are the way to go.	4/23/2019 4:01 AM
25	Don't want any opportunities for crime, drugs or homeless camp outs.	4/22/2019 9:49 PM
26	I don't think I would feel safe there especially with a young daughter	4/22/2019 9:33 PM
27	It will be dangerous.	4/22/2019 9:21 PM
28	Can't be seen by anyone above	4/22/2019 3:40 PM
29	Same answer	4/22/2019 12:08 PM
30	Homeless and criminal element likely present there	4/22/2019 8:03 AM
31	Unsafe for women and children- please provide an overhead pedestrian bike bridge over the roadway.	4/22/2019 7:21 AM
32	Safety concern and homeless taking up residence. pedestrian overpass should be considered.	4/21/2019 8:04 AM
33	not safe to cross in a tunnel. doesn't make sense.	4/20/2019 11:29 AM
34	I don't walk along Richmond Highway	4/19/2019 7:25 PM
35	I would not feel safe	4/19/2019 3:06 PM
36	safety concerns	4/19/2019 1:13 PM
37	My understanding. No trash No snow or removal. As of now, homeless/vagrant in area. Area might be different in 25yrs after road & developers finish	4/19/2019 10:32 AM
38	I would use the underpass only if well lit & safe	4/19/2019 9:52 AM
39	Safety first	4/19/2019 8:36 AM
40	What happens to the path when the creek floods? It does quite often. Besides there are few people who walk that section.	4/19/2019 1:12 AM
41	Not safe	4/19/2019 12:40 AM
42	Same as above	4/18/2019 11:03 PM
43	Who wants to walk underground?	4/18/2019 10:11 PM
44	I currently would not use this underpass as I am never on that part of Rt. 1. I take Jeff Todd Way or go around via Huntley Meadows to get to Springfield, Hayfield and Kingstowne. That doesn't mean there shouldn't be an under pass there however. If the bike share has a location at the new Army Museum, that would be a great way to get across highway to connect with the bike path that goes along the Potomac River.	4/18/2019 9:52 PM
45	Agy, too dangerous. The tunnels would be used as shelters for people.	4/18/2019 9:48 PM
46	I live near MVHS. Too far to walk for shopping. If connecting to the wetlands it might be useful for bike riders. Adjoining neighborhoods will benefit.	4/18/2019 9:39 PM
47	to dangerous	4/18/2019 9:25 PM

**Richmond Highway**

48	Safety - individuals especially folks walking alone, the elderly and women will be targets for gangs, robbers and sexual predators. Vandalism - the walls of the underpasses will be canvases for individuals to express themselves, litter and human waste - lack of cleanliness --- the underpass walls will serve as an outdoor toilet for folks to relieve themselves, lastly the underpasses will provide a shelter for homeless folks to shelter in which in turn raises sanitation and litter issues	4/18/2019 9:07 PM
49	people are never walking there. why consider building something that wont be used/?	4/18/2019 8:57 PM
50	Very dangerous	4/18/2019 8:55 PM
51	Because this is a dangerous part of our neighborhood and wouldn't be safe	4/18/2019 8:35 PM
52	With the rising crime rate above ground, an underpass would be too dangerous to use.	4/18/2019 6:28 PM
53	Unnecessary	4/18/2019 5:27 PM
54	Same as number 1 above. Police would be required to exit patrol cars regularly to ensure there are no lurkers or homeless people living there.	4/18/2019 5:15 PM
55	Prefer overpass where pedestrians are visible	4/18/2019 5:02 PM
56	Same.	4/18/2019 4:53 PM
57	Same as above!	4/18/2019 4:35 PM
58	Again not much foot traffic there most cross at the hotel or just south of sacramento	4/18/2019 4:07 PM
59	For all the disadvantages listed in the proposal: Safety • Maintenance • Trash • Graffiti • Snow • flooding	4/18/2019 3:59 PM
60	will be dirty, dark, unsafe	4/18/2019 3:50 PM
61	Same as above. Unless the road is fenced off neither the under pass or road widening will make any safety improvements	4/18/2019 3:33 PM
62	I feel it would be unsafe. People could be assaulted.	4/18/2019 3:29 PM
63	Crime ridden area	4/18/2019 3:24 PM
64	It will be a dark, unsupervised place that will be more often used for activities that I don't want to walk past. I would use an overpass.	4/18/2019 3:12 PM
65	Same as above. Criminals will be attacking people.	4/18/2019 1:21 PM
66	Safety concerns: it's a long underpass, and pedestrian traffic (eyes on the street) will be minimal	4/18/2019 12:23 PM
67	Unsafe. Asking for crime	4/18/2019 12:14 PM
68	Same	4/18/2019 11:36 AM
69	unsafe, will become a criminal hangout	4/18/2019 11:30 AM
70	wouldn't feel safe	4/18/2019 11:12 AM
71	See above	4/17/2019 6:39 AM
72	I don't go to that section of Richmond Hwy.	4/16/2019 11:46 PM
73	Pedestrian traffic at Napper is worse.	4/16/2019 5:43 PM
74	I don't cross there.	4/16/2019 5:16 PM
75	If lighting and safety address then yes	4/16/2019 5:07 PM
76	Due to the crime and violence in that area it creates an unsafe area and haven for bad things to happen. Proper signs, signals and crosswalks are safer. Sidewalks would be a bonus since there are none anyway.	4/16/2019 4:28 PM
77	Magnet for crime	4/14/2019 8:34 PM
78	See above	4/11/2019 11:01 PM
79	I really don't know this one	4/11/2019 1:28 PM
80	potential danger of mugging	4/11/2019 5:41 AM
81	underpasses make easy spots for muggers to take advantage of people	4/10/2019 10:40 PM

**Richmond Highway**

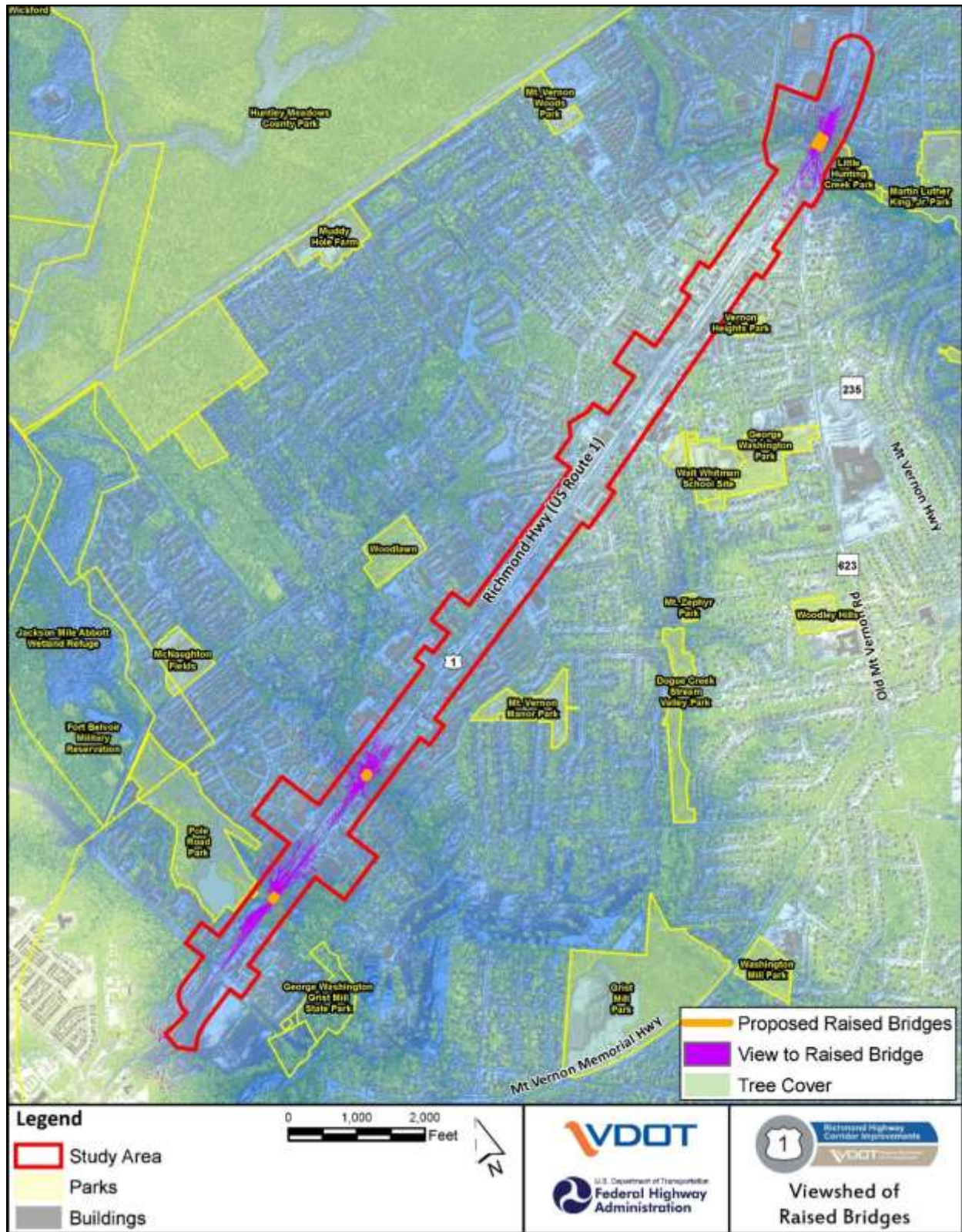
82	lack of security, would provide cover for drugs, crime	4/10/2019 2:13 PM
83	Same reasons as above,	4/10/2019 2:49 AM
84	o safety would also be a concern.	4/9/2019 9:22 PM
85	Potential to crime	4/9/2019 6:56 PM
86	I think that it's a starting point for issues (crime, garbage) and will not be properly maintained and will quickly go downhill.	4/9/2019 4:30 PM
87	A hazardous/dangerous option!	4/9/2019 1:28 PM
88	too easy for vandals, thugs and miscreants to take advantage of people crossing underground out of sight	4/9/2019 10:44 AM
89	If they are dark and closed = equals safety concerns	4/9/2019 10:23 AM
90	Not a good crossing location	4/9/2019 9:24 AM
91	In the five years I've lived in this area I don't think I've EVER seen anyone crossing on foot or bicycle at this intersection so I don't see the need.	4/8/2019 9:31 PM
92	no side walks to get to the underpass from my home; unsafe area; expensive	4/8/2019 6:58 PM
93	The underpass is a ridiculous idea for security and crime reasons to begin with!	4/8/2019 5:34 PM
94	Going into the darkness of a tunnel alone is not safe.	4/8/2019 5:10 PM
95	Danger	4/8/2019 5:07 PM
96	SAFETY is a huge concern, as is maintenance	4/8/2019 5:02 PM
97	Already an unsafe area and this would increase the issues	4/8/2019 4:34 PM
98	I don't cross the street there.	4/8/2019 4:34 PM
99	Would not feel safe.	4/8/2019 4:27 PM
100	Any underpass will be a great spot for homeless and drug addicts!	4/8/2019 12:43 PM
101	It's this a historic flood zone? Again, safety and lack of security is a major concern with any underground pathway.	4/7/2019 11:45 PM
102	Who actually walks here? It would be wasteful	4/7/2019 11:06 PM
103	Safety concerns	4/7/2019 10:09 PM
104	SEE ABOVE	3/30/2019 8:33 AM
105	Same as above	3/29/2019 12:19 PM
106	Safety concerns, homeless people, criminals	3/28/2019 4:29 PM
107	I would consider it unsafe at any time of the day or night.	3/28/2019 3:29 PM
108	Crime, lighting, trash, snow, water, spray painting issues, cost, who will maintain the problems.?	3/27/2019 8:17 AM
109	Switchbacks are difficult to navigate at speed, Underpass likely to flood often. Also likely to be utilized as homeless camp	3/26/2019 11:57 PM
110	While convenient to build at the bridges, theres NOTHING around the sites that causes one to want to cross the street.	3/25/2019 10:19 PM
111	Would create environmental and security problems	3/25/2019 11:13 PM
112	To dangerous	3/25/2019 8:46 PM
113	Safety - if I were alone I would be extremely cautious about using such an isolated route. An overpass or street level crossing would be safer.	3/25/2019 4:11 PM

## **Appendix C: Agency Coordination**

## **Appendix D: Historic Huntley Viewshed Analysis**



**Figure 1: Raised Bridges Viewshed Analysis Results**





**Figure 2: Detail of Historic Huntley showing no points from where the proposed raised bridges would be seen.**

